

Childhood Lead Poisoning in The City of St. Louis



Annual Report 2008

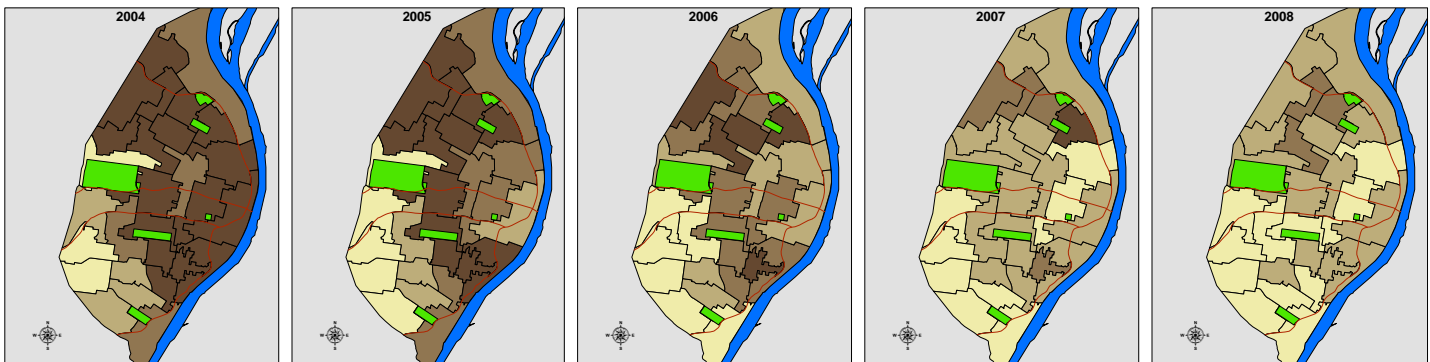
City of St. Louis
Department of Health
Childhood Lead Poisoning Prevention Program

Statistics at a Glance

City of St. Louis Childhood Lead Poisoning Surveillance 2004-2008

Screening	2004		2005		2006		2007		2008		
Population <6 years old (2000 Census)	27,894		28,053		29,064		29,064		31,430		
St. Louis City Children Screened	13,249		11,227		12,779		12,836		13,634		
Percent eligible screened	47.5%		40.0%		44.0%		44.2%		43.4%		
Mean age in years	2.8		3.0		3.0		2.9		2.9		
Male:Female Ratio	1.03		1.03		1.04		1.05		1.05		
Race (%)											
African American	5,601	42.3%	8,067	71.9%	9,147	71.6%	9,114	71.0%	9,725	71.3%	
White	636	4.8%	2,032	18.1%	2,300	18.0%	2,522	19.6%	2,757	20.2%	
Other	232	1.8%	167	1.5%	690	5.4%	457	3.6%	347	2.6%	
Race Missing	6,780	51.2%	961	8.6%	642	5.0%	743	5.8%	805	5.9%	
Total	13,249	100%	11,227	100%	12,779	100%	12,836	100.0%	13,634	100.0%	
Lead Poisoning	2004		2005		2006		2007		2008		
Prevalent Cases (Pb ≥ 10 µg/dl)	1,189		1,025		892		567		502		
Screening Prevalence Rate (%)	9.0%		9.1%		7.0%		4.4%		3.7%		
Incident Cases (Pb ≥ 10 µg/dl)	629		406		512		345		334		
Screening Incidence Rate (%)	5.5%		4.0%		4.3%		2.9%		2.6%		
Blood Lead Results											
0-4 µg/dl	8,596	64.9%	7,413	66.0%	8,778	68.7%	9,753	76.0%	11,145	81.7%	
-negligible blood lead											
5-9 µg/dl	3,464	26.1%	2,789	24.8%	3,109	24.3%	2,516	19.6%	1,987	14.6%	
-evidence of exposure but not lead poisoned											
≥ 10 µg/dl	1,189	9.0%	1,025	9.1%	892	7.0%	567	4.4%	502	3.7%	
-lead poisoned											
Missouri Screening Prevalence Rate	3.0%		2.8%		2.2%		1.5%		1.2%		
U.S. Estimated Prevalence Rate	1.8%		1.6%		1.2%		1.2%		1.2%		

2004-2008 Reduction of the Screening Prevalence Rate by Aldermanic Wards



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The 2008 CLPPP Annual Report can be downloaded from:
<http://stlouis.missouri.org/citygov/health/reportslead.html>



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Executive Summary

Since 1996 the City of St. Louis Department of Health has published annual reports regarding childhood lead poisoning (CLP). In this, the thirteenth edition, we are proud to announce that the screening prevalence rate has again dropped to a new low of 3.7%.

A rate of 3.7% continues to exceed state and national rates and considerable work remains in St. Louis. However, the rate in 2001 was 16.2%, which means that in just seven years, the rate of CLP has decreased by over 77 percent in the City of St. Louis.

These results are the product of a collaborative approach by four City agencies: the Department of Health, the Building Division, the Community Development Administration, and the

Problem Properties Court. In addition, numerous community partners contribute to the effort via the Lead Safe St. Louis Task Force.

As its predecessors, this report will describe many aspects of CLP in St. Louis. Several factors appear to have significant effect on exposure to lead. Age, socioeconomic status, physical geography, and time of year are some of the variables that play a role in the likelihood of children being exposed to environmental lead.

We hope this report is informative and contributes valuable information to the discussion surrounding childhood lead poisoning in the City of St. Louis.

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Screening Incidence Rates by Ward

Screening Prevalence Rates by Neighborhood
Screening Incidence Rates by Neighborhood

What is Childhood Lead Poisoning?

How it Happens, Symptoms, and State and National Statistics

The Centers for Disease Control and Prevention (CDC) have set the threshold for lead poisoning at 10 micrograms of lead per deciliter of blood ($\mu\text{g}/\text{dl}$). Childhood lead poisoning (CLP) occurs when a child has a blood lead test that meets or exceeds this threshold. Approximately 250,000 children aged 1-5 years have elevated blood lead levels in the United States.

The major source of lead exposure among U.S. children is lead-based paint and lead-contaminated dust found in deteriorating buildings. Historically, the main source of lead exposure was automobile exhaust. However, since lead was removed from gasoline in the 1970's, epidemiologic evidence has determined that most lead exposure occurs in the home environment from lead paint dust and chips.

Lead often enters the body when children put their hands or other objects covered with lead dust into their mouths or, less commonly, eat paint chips or soil that contains lead. Lead poisoning may also result from breathing in lead dust created during renovation or home repair.

Lead-based paints were banned for use in housing in 1978. However, approximately 24 million housing units in the United States have deteriorated lead paint and elevated levels of lead-

contaminated house dust. More than 4 million of these dwellings are home to one or more young children.

More than 90% of the housing stock in St. Louis was built before 1978. This does not mean that all those homes have lead paint hazards in them. However, in a considerable portion of dwellings, the paint is chipping and turning into dust, which creates a dangerous situation.

Lead poisoning can affect nearly every system in the body. It can cause learning disabilities, behavioral problems, and at very high levels, seizures, coma, and even death. It is also very difficult to detect without a blood test. Rarely are symptoms evident, even at relatively high levels.

The screening prevalence rate (SPR) is the most common way to measure how widespread CLP is. In the United States, the SPR is estimated at 1.2%. This means that approximately 1.2% of children who had a blood test for lead had a level at or above 10 $\mu\text{g}/\text{dl}$.

In Missouri, the SPR is also about 1.2% of children screened. In 2008, the City of St. Louis had an SPR of 3.7%. While still considerably higher than state and national rates, five years ago the City of St. Louis' rate was almost 14%.

Who Was Tested for Childhood Lead Poisoning in 2008?

Testing Guidelines

There are approximately 31,000 children under the age of six residing in the City of St. Louis. In order to effectively monitor CLP in St. Louis, the Department of Health receives both monthly and annual data on every child screened for CLP in the City.

Because the entire City of St. Louis is classified as a high-risk area, Missouri guidelines state that all children under six years of age must be screened for CLP annually (**Table I**).

Table I
Missouri Lead Testing Plan

High-Risk Areas	Non-High Risk Areas
<ul style="list-style-type: none"> Any <u>child under the age of six years</u> living in or visiting for 10 hours per week or more, the high-risk area, <u>will be tested annually</u> for lead. Daycare facilities are required to record a "<u>proof of lead testing</u>" signed by the Health Care Provider performing the test <u>within thirty (30) days of the child's enrollment</u>. If the parent/guardian does not provide it or a written statement stating why they do not want the child tested, the daycare facility is to offer the parent assistance in scheduling a test. Any <u>child found to be at High-Risk</u>, is living in a residence that was built before 1978, and is <u>undergoing renovation</u>, <u>may be tested every six months</u> and once following completion of the work. (Also applies to children found to be at high-risk in non high-risk areas.) 	<ul style="list-style-type: none"> Any <u>child under the age of six years</u> visiting for 10 hours per week or more, a high-risk area, <u>will be tested annually</u> for lead. All <u>Medicaid eligible children</u> will be blood tested for lead at 12 and 24 months of age. It is recommended that all children (regardless of Medicaid eligibility) be <u>tested for lead at 12 and 24 months of age</u>. (This statement does not appear in the law, but applies as HCFA policy and DHSS recommendations.) Beginning at <u>age six months up to age six years</u> every child will <u>be screened by verbal risk assessment</u> (DHSS/DSS questionnaire) to determine whether they are at high risk. <u>Every child, less than age six, found to be at high risk, will be tested for lead.</u>

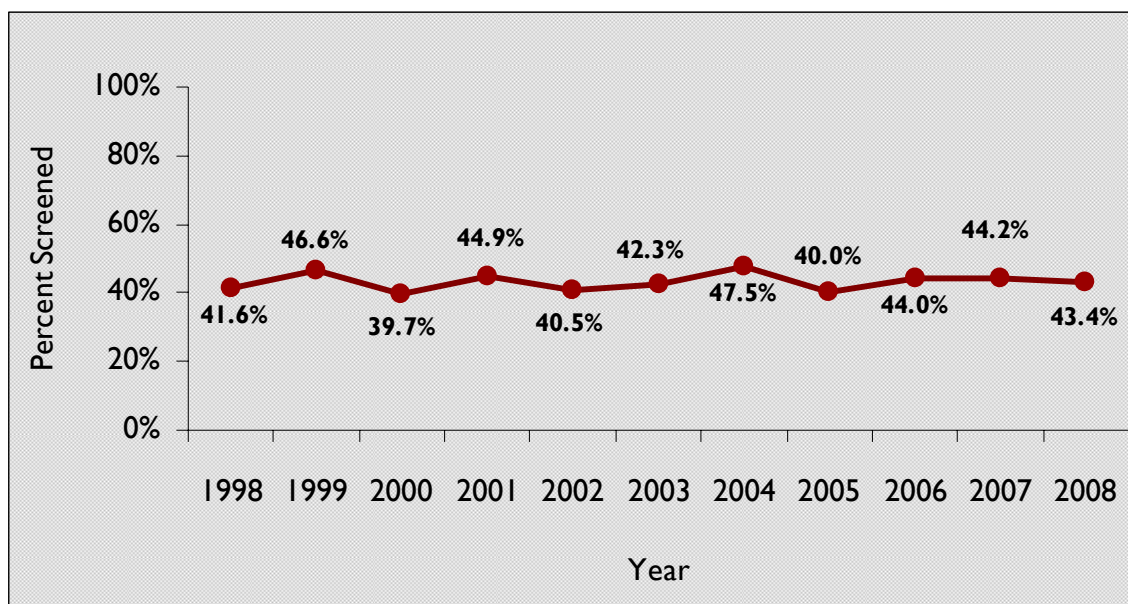
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Citywide Numbers

In 2008, there were 13,634 children screened for CLP in the City of St. Louis. Although this number reflects a six percent increase in screening from 2007 (12,836 children screened), this again represents about 44% of St. Louis children under 6 years old due to increasing population estimates.

Although the state of Missouri mandates that all children under 6 must be screened, increasing the percent of children screened has proven difficult historically (Figure 1).

Figure 1
Percentage of Children Screened for Lead Poisoning, 1998-2008



The Department of Health (DOH) relies on primary care physicians to screen children for CLP. The DOH screened 1,591 children in 2008, but does not have the capacity to test all 30,000 children in the City.

One of the difficulties in screening 100% of City children is a perception by physicians that some children do not need to be screened for various reasons. Some areas of the City, particularly the southwest regions, have

had considerably lower rates of CLP than other areas of the City. While this is a good thing, it is important to screen all children for CLP. Not all homes in the areas with low prevalence rates are free of lead hazards. Physicians assuming that a child from a particular area of the City will not be exposed to lead, ignore the chances that the child could still be lead poisoned.

Additionally, many physicians think that if a child is not lead poisoned by the age

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of 2, there is no need to screen anymore because the age of 2 is the age at which a child is most likely to be lead poisoned. This too is dangerous. A City of St. Louis cohort study found that 8.1% of children not lead poisoned at age 2 were found to be lead poisoned at a later age. Also, of children who had

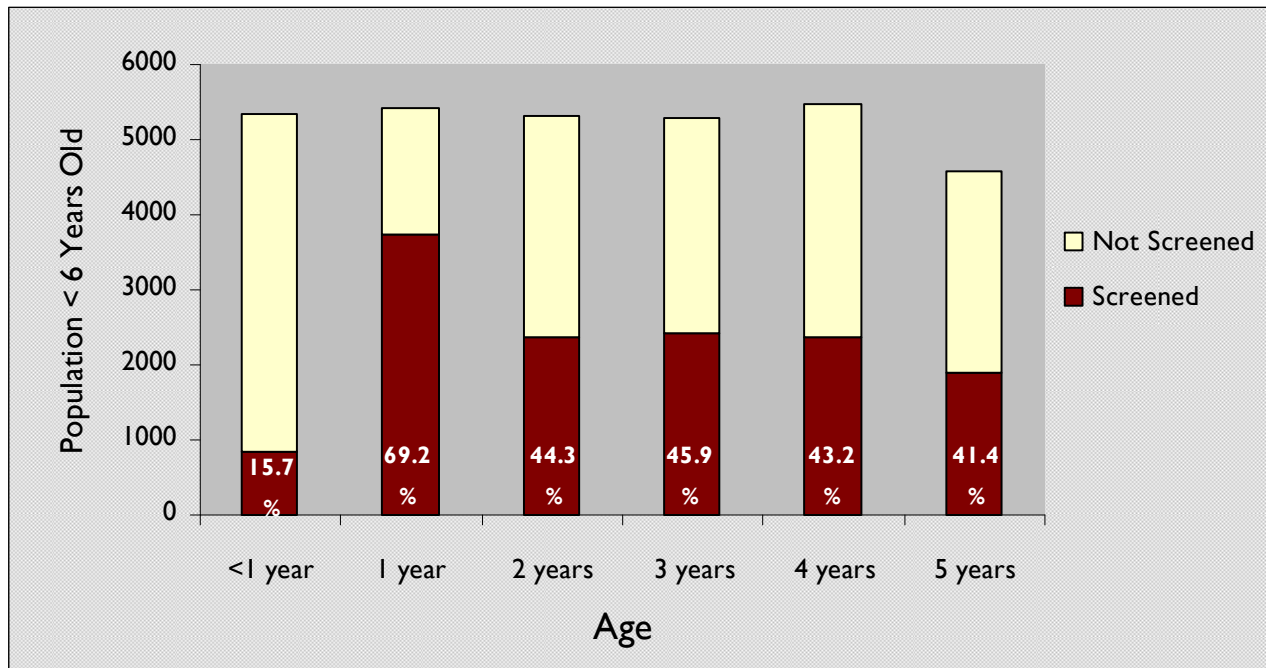
undetectable levels of lead in their blood at ages 1 and 2, 30% of them had a level of at least 5 $\mu\text{g}/\text{dl}$ later. This information is disseminated to physicians in order to educate them about the importance of screening all children through age 6.

Screening and Age

As stated above, there is a challenge involved with screening all children under 6 years old. Looking within age groups, the highest screening rate (69.2%) is for children 1 year of age (Figure 2). This is the age at which the first recommended screening should

occur. A similar peak in screenings should appear in the 2-5 year old populations indicating that children are being consistently screened on an annual basis. However, screening appears to drop off once a child reaches 2 years of age.

Figure 2
Children Screened for CLP by Age, 2008



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Targeted Screening

Figure 3
Testing Ratios of Children Screened, 2008

ZIP	Testing Ratio	SPR (%)
63106	1.36	2.01
63107	1.24	6.27
63147	1.24	3.58
63112	1.23	4.51
63115	1.18	6.87
63120	1.18	5.63
63111	1.12	2.01
63113	1.10	5.91
63118	1.07	4.20
63116	0.95	2.50
63108	0.93	3.89
63104	0.93	2.78
63101	0.79	2.17
63110	0.78	3.32
63103	0.70	0.00
63109	0.69	1.33
63139	0.60	0.23

disproportionately testing more children
 proportional testing of children
 disproportionately testing fewer children

Because designated high-risk areas of the City are consistently targeted for lead screening, more children are screened who have elevated blood lead levels (Figure 3). Figure 3 represents a ratio, demonstrating where CLP screenings occur proportional to the population of the ZIP code. It can be interpreted as follows: the 63107 ZIP code represents 6.8% of all lead screenings in 2008, but only 5.5% of the City's population under 6 years of age. Thus, the ratio of 1.24 means that proportional to its population, more screenings occur in 63107.

This table sheds light on a few important points regarding screening and childhood lead poisoning in St. Louis in general. First, it shows that, by and large, children are screened with greater frequency in ZIP codes that have higher screening prevalence rates. Second, it can be reasonably inferred that if 100% of children in the City were screened, the screening prevalence rate would be considerably lower as a greater proportion of the children that have not yet been screened for lead poisoning reside in ZIP codes with significantly lower prevalence rates.

Who Was Lead Poisoned in 2008?

Citywide Numbers

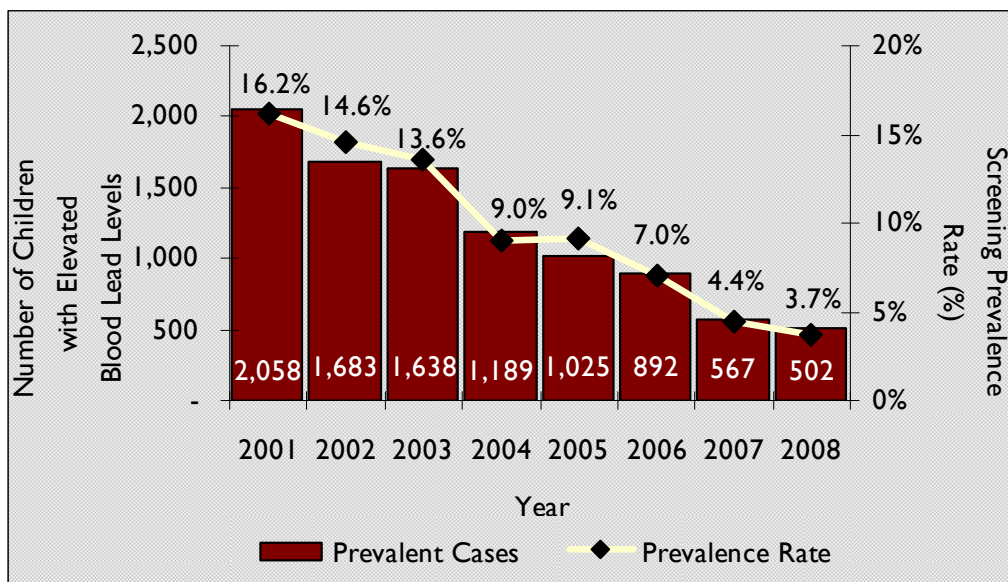
502 children were found to have elevated blood lead levels in 2008. The screening prevalence rate (SPR) of 3.7% is the number of children screened with blood lead levels $\geq 10 \mu\text{g/dl}$ divided by the total number of children screened (502/13,634). It includes those who test elevated for the first time (incident cases) and those who had been diagnosed with CLP in a previous year (prevalent cases). It is difficult to reduce the lead body burden in children, especially if continued exposure occurs. Once poisoned, children can maintain elevated levels for some time unless aggressive measures are taken.

The City of St. Louis began to see a marked decrease in the number of children poisoned by lead in 2001. Between 2001 and 2003, the number of cases decreased modestly. 2004 was marked by a substantial decrease in SPR,

followed by a leveling out in 2005, and a steady decrease again from 2006-2008 (Figure 4).

It is likely that, as programs continue to succeed and the rate continues to decline, the rate will begin to decline at a lower percentage from year to year. This is not surprising, however. Often, it is more difficult to reach areas and populations where lead is either entrenched or emerging. The reasons for this may be numerous ranging from language barriers and poverty to fear and distrust of government. This slower rate of decline is evident already between 2007 and 2008. One cannot be certain that the rate will continue to slow its pace of decline or even continue declining at all, but it is the most likely scenario.

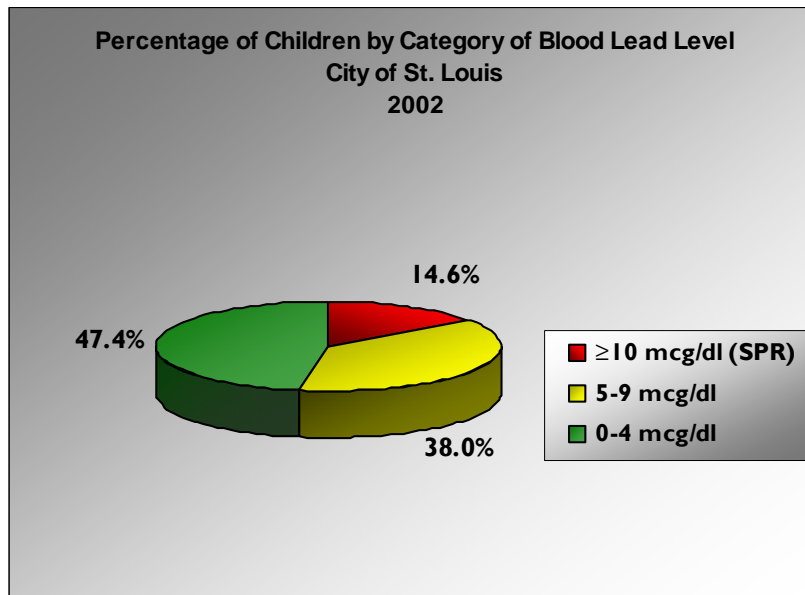
Figure 4
Screening Prevalence Rate, 2001-2008



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Case Distribution

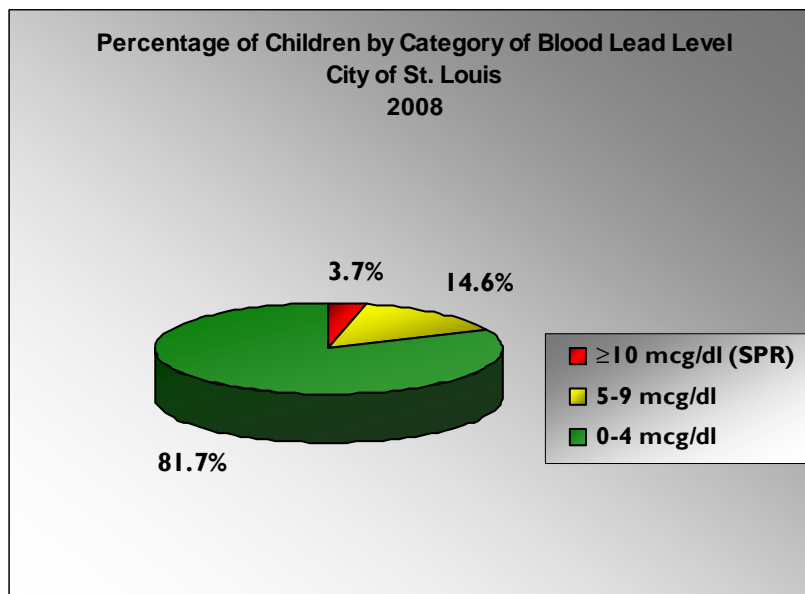
Figure 5
Blood Lead Results, 2002



A child's blood lead level is the best way to determine the severity of their exposure to lead. A simple way to think about lead exposure is to categorize various blood lead levels. The pie charts to the left have three categories of blood lead levels (BLL):

- Minimal or no lead exposure (green)
- Not lead poisoned but evidence of some exposure (yellow)
- Lead poisoned (red)

Figure 6
Blood Lead Results, 2008



The top chart represents blood lead levels in 2002, while the bottom chart is 2008 levels. Of significance is the dramatic increase in the proportion of children in the category of least exposure. In 2002, the 0-4 $\mu\text{g}/\text{dl}$ category accounted for less than half of St. Louis children. In 2008, almost 82 percent of children screened were in the most favorable category.

In early 2007, Lead Safe St. Louis (LSSL) employees began an outreach program aimed at primary prevention of CLP. Whenever a child was not lead poisoned but had a BLL of 5-9 $\mu\text{g}/\text{dl}$, the family was contacted, educated about ways to reduce lead exposure, and encouraged to have a lead inspection.

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Demographic Profile

CLP varies across several demographic variables. Age, race, and socioeconomic status all have correlations with lead poisoning. Below is a table outlining some of

these variables for CLP in 2008. Following, each of these variables and some others will be discussed at further length.

Figure 7
Demographic Profile of CLP, 2008

Demographic		Number Screened	Percent of Total Screened	Number ≥ 10 µg/dl	Screening Prevalence Rate (%)	Number of New Cases	Screening Incidence Rate (%)	0-4 µg/dl		5-9 µg/dl		≥ 10 ug/dl	
								N	%	N	%	N	%
Age	Less than 1 year old	842	6.2%	8	1.0	7	0.8	792	94.1%	42	5.0%	8	1.0%
	1 year old	3,745	27.5%	155	4.1	135	3.6	3,061	81.7%	529	14.1%	155	4.1%
	2 years old	2,361	17.3%	135	5.7	92	4.1	1,776	75.2%	450	19.1%	135	5.7%
	3 years old	2,425	17.8%	96	4.0	55	2.5	1,948	80.3%	381	15.7%	96	4.0%
	4 years old	2,368	17.4%	74	3.1	33	1.6	1,964	82.9%	330	13.9%	74	3.1%
	5 years old	1,893	13.9%	34	1.8	12	0.7	1,604	84.7%	255	13.5%	34	1.8%
Gender	Female	6,664	48.9%	223	3.3	147	2.3	5,510	82.7%	931	14.0%	223	3.3%
	Male	6,970	51.1%	279	4.0	187	2.8	5,635	80.8%	1,056	15.2%	279	4.0%
Race	African American	9,725	71.3%	423	4.3	281	3.1	7,675	78.9%	1,627	16.7%	423	4.3%
	White	2,757	20.2%	55	2.0	35	1.3	2,457	89.1%	245	8.9%	55	2.0%
	Other	347	2.5%	5	1.4	5	1.5	315	90.8%	27	7.8%	5	1.4%
	Unknown	805	5.9%	19	2.4	13	1.7	698	86.7%	88	10.9%	19	2.4%

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Age and CLP

Age is one factor that can affect a child's chances for becoming poisoned by lead (Figure 8). Children 2 years of age had the highest SPR in 2008. These children are more active in exploring their environments and also have poor hand-washing skills. Children at 1 year of age are less mobile than children at 2 years of age. Two year olds may also have higher screening prevalence rates than one year olds because lead stays in a child's blood stream and is difficult to get rid of once a child becomes poisoned.

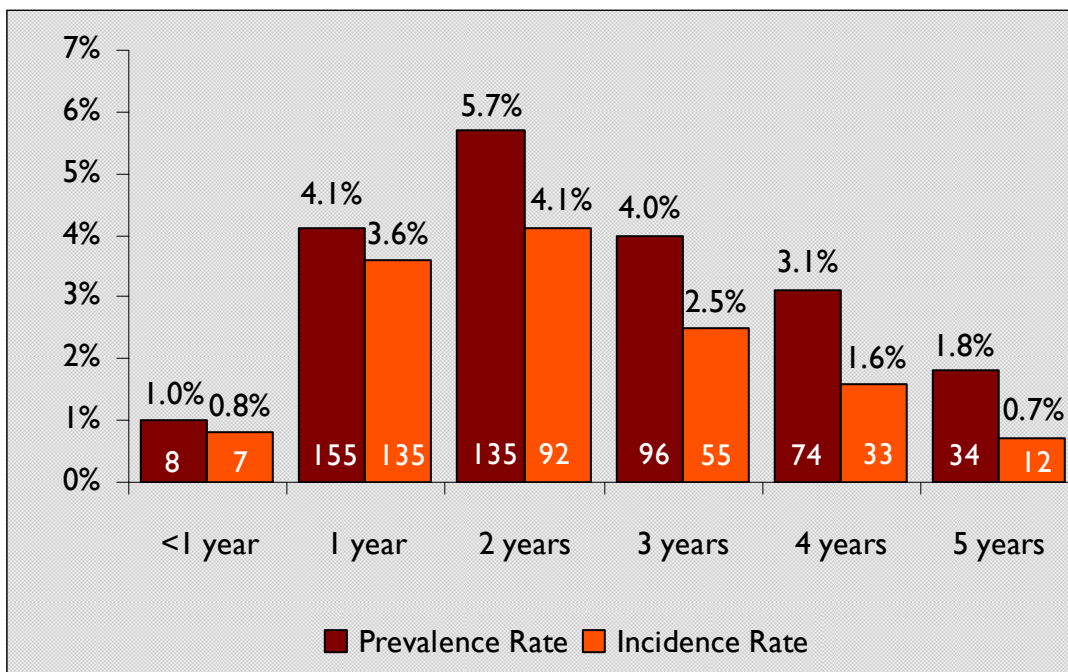
Therefore, it is important to also look at the screening incidence rate (SIR),

which only includes new cases of lead poisoning. The SIR for 2 year olds (4.1%) is virtually the same as that for 1 year olds (3.6%), and it continues to decrease for 3 year olds and recede in 4 and 5 year olds as well.

The SIR for children of all age groups decreased in 2008 from 2007 with a citywide decrease from 2.9% to 2.6%.

The screening prevalence and incidence rates for children less than 1 year of age are almost identical in 2008. Children at this age are young enough that they have rarely been tested for CLP before. Thus, most cases are new cases.

Figure 8
Prevalent and Incident Cases of Lead Poisoning by Age, 2008



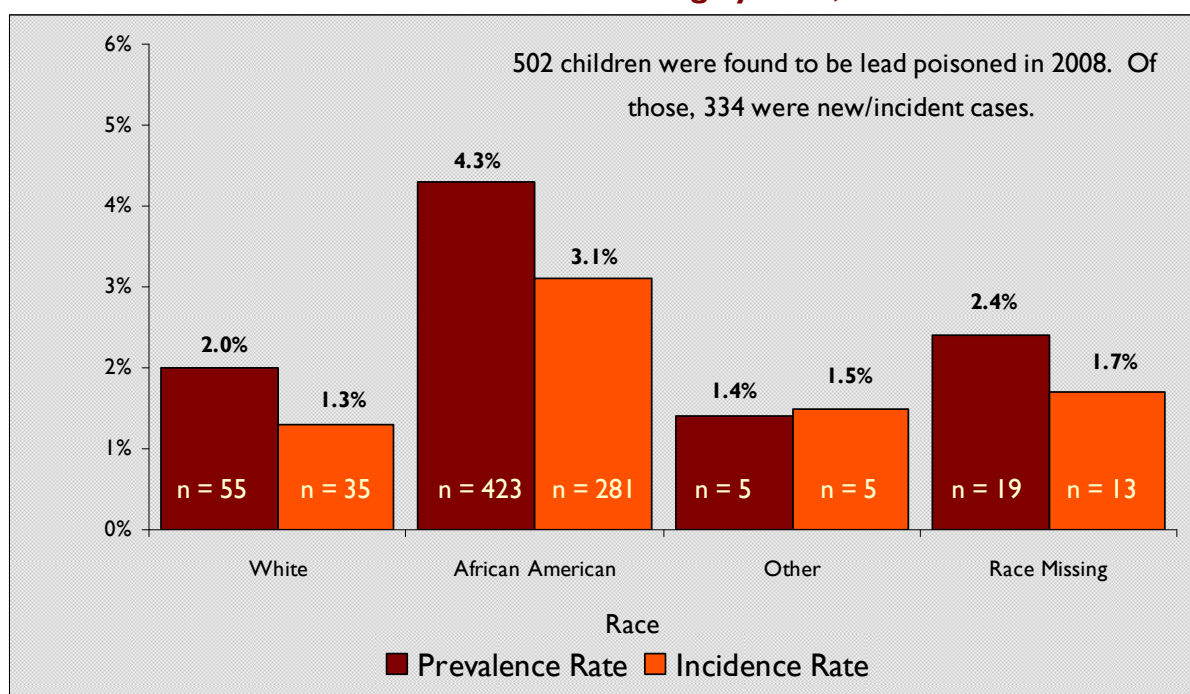
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Race and CLP

In and of itself, race is not an indicator of CLP. However, other risk factors such as poverty, poor housing stock, insufficient access to medical care, and inadequate quality medical care are higher among minorities and these

factors contribute to CLP. In 2008, 71% of the children screened for CLP were African American. However, African American children accounted for over 84% (423/502) of all lead poisoned children in 2008 (Figure 9).

Figure 9
Prevalent and Incident Cases of Lead Poisoning by Race, 2008



Gender and CLP

An examination of gender and CLP does not show any significant differences between males and females. Nearly even numbers of males and females were tested for CLP in 2008. Females make up about 49% of children tested in

2008 while males make up about 51%. Males were slightly more likely to be lead poisoned (SPR=4.0%) than females (SPR=3.3%) in 2008 (refer back to Figure 7).

When Does Childhood Lead Poisoning Occur?

Seasonality and CLP

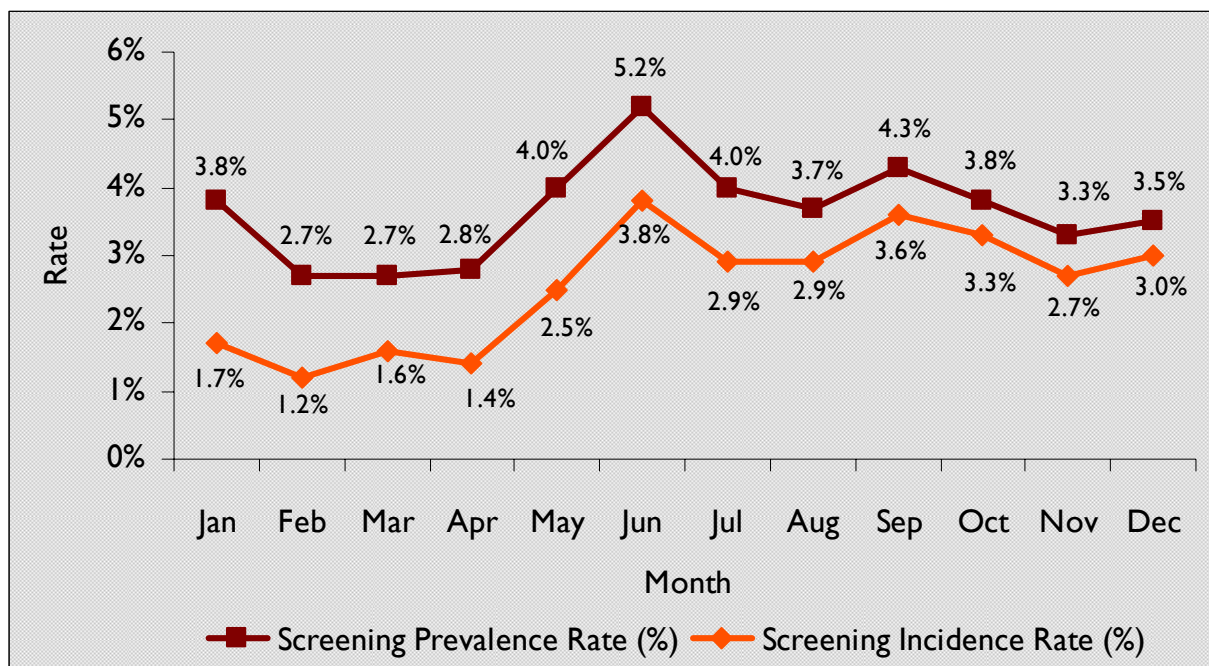
CLP can occur at anytime throughout the year. However, it is typical to see higher rates of CLP in the warmer months of the year. Several factors may contribute to higher rates during warmer months. Children play outside more in the summer and may be exposed to lead dust in the soil. Also, contaminated dirt tracked into the house by others may lead to higher rates.

Additionally, many families (especially those without air conditioning) open the windows in warmer months. This could lead to higher CLP rates in two ways. First, the friction of opening and closing windows painted with lead paint can

create additional lead paint chips and dust. Second opening windows allows wind to blow through a house, which could exacerbate exposure to airborne lead dust.

Another important consideration when evaluating the seasonality of CLP is the imperfect nature of reporting mechanisms. Oftentimes, blood lead tests, which get delayed for various reasons from the previous year, accumulate and then get reported as “January” screenings in the next year, which has lead to historically higher rates of CLP in the beginning of the calendar year (Figure 10).

Figure 10
Prevalent and Incident Cases of Lead Poisoning by Month, 2008



Where Does Childhood Lead Poisoning Occur?

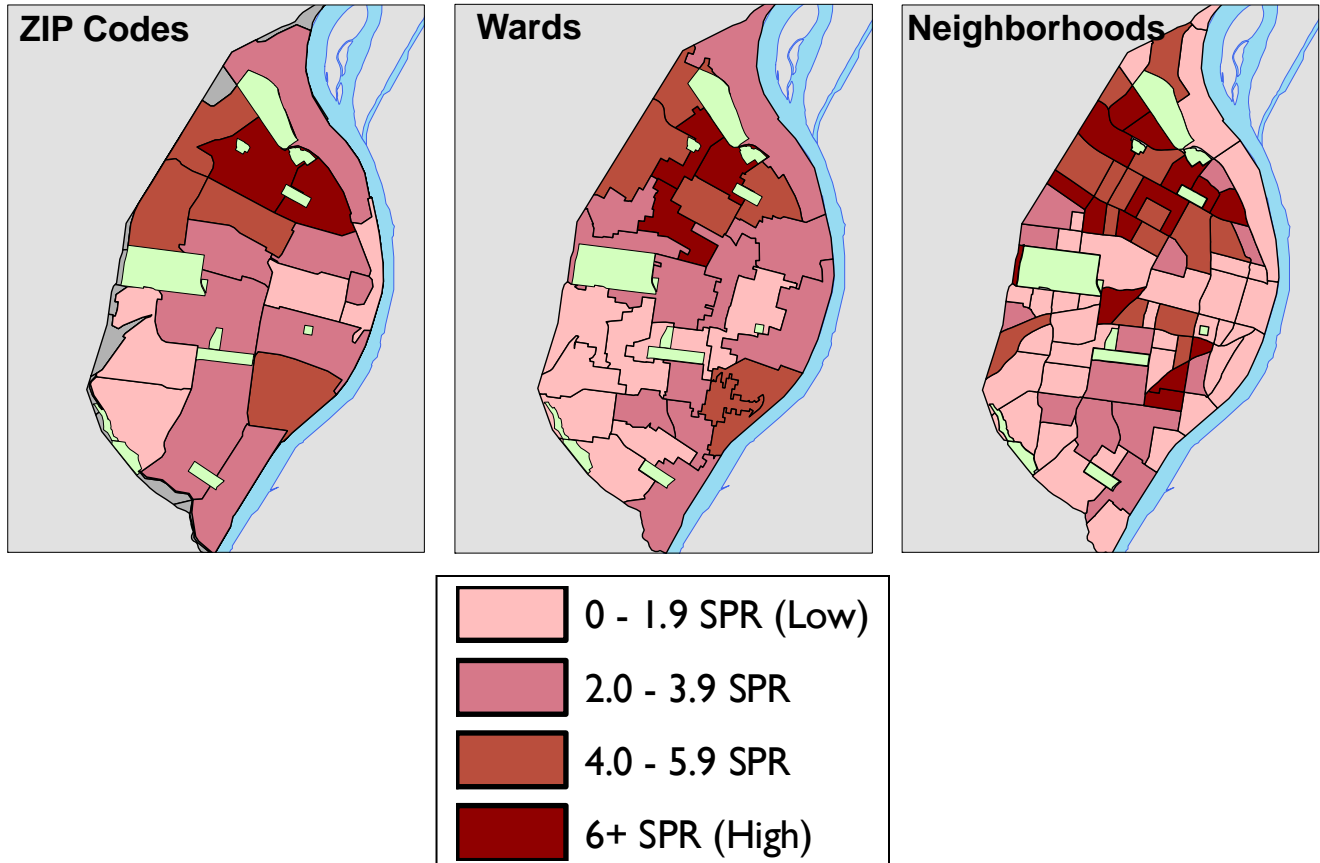
Geography and CLP

The use of geography in lead poisoning surveillance assists the Health Department in developing targeted programs in high prevalence areas. It also allows for the analysis of the CLP problem on a smaller, more local scale. Maps can help local leaders understand the problem as it affects their community and motivate them to develop, promote and participate in prevention activities.

Areas of lower socioeconomic status and older, more deteriorated housing stock generally have higher rates of CLP

than more affluent areas. The maps below provide three thumbnail views of CLP in St. Louis with increasing levels of acuity (**Figure 11**). The first map is of the 18 ZIP codes contained within the City. The second is of the 28 aldermanic wards. The final map displays the City's 79 various neighborhoods. The darker colored areas represent the places where CLP is most prevalent (see legend below). Light green areas are assorted City parks. Larger and more detailed maps for both prevalence and incidence rates are provided later in the appendix.

Figure 11
Geography of Lead Poisoning Prevalence, 2008



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ZIP Codes and CLP

There are 18 ZIP Codes completely contained in the City of St. Louis. In 2008, two City ZIPs were in the category of greatest concern (prevalence rate of 6 or more). The Zip

Codes with the five highest rates were 63115 (6.9), 63107 (6.3), 63113 (5.9), 63120 (5.6), and 63112 (4.5). These five ZIP Codes are located in the northern region of the City.

Wards and CLP

There are 28 aldermanic wards in St. Louis. The prevalence rate in these wards ranged from zero in 2 different wards to 6.8 in Ward 21. Ward 21 is joined by Wards 1 and 18 the in the category of most concern, but barely over the threshold. The wards with the five highest prevalence rates in 2008 were Ward 21 (6.8), Ward 1 (6.4),

Ward 18 (6.0), Ward 3 (5.9), and Ward 22 (5.7). As with ZIP Codes, the top five Wards are in northern areas of the City.

The five wards with the lowest prevalence rates in 2008 were Ward 12 (0.0), Ward 23 (0.0), Ward 16 (0.4), Ward 10 (1.2), and Ward 24 (1.3).

Neighborhoods and CLP

There are 79 neighborhoods in the City of St. Louis. Due to population factors, the number of children screened in City neighborhoods ranges from 1,051 to zero. Accordingly, rates where small numbers of children are screened need to be interpreted with caution, as small numbers make for volatile rates. However, among neighborhoods with adequate numbers of children screened, prevalence rates ranged from zero in several neighborhoods to over 10.0 in one neighborhood.

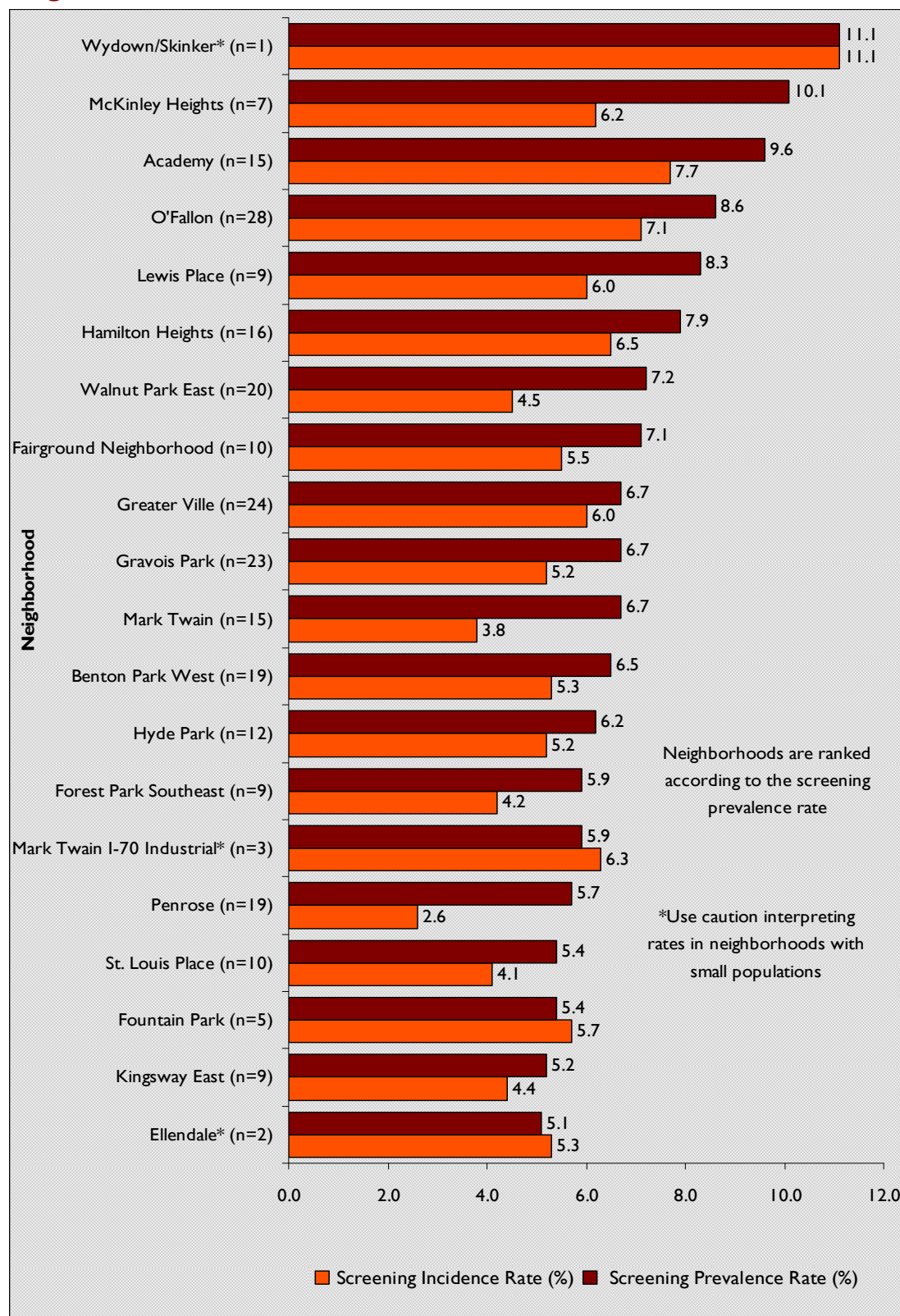
The five neighborhoods with the highest rates of CLP (with adequate sample size) were McKinley Heights (10.1),

Academy (9.6), O'Fallon (8.6), Lewis Place (8.3), and Hamilton Heights (7.9).

The fifteen neighborhoods with zero cases of CLP and a significant number of children screened are The Hill, Boulevard Heights, Princeton Heights, St. Louis Hills, Lindenwood Park, Clifton Heights, Southwest Garden, Souard, Compton Heights, Lafayette Square, Downtown, Downtown West, Clayton/Tamm, Hi-Point, and Visitation Park. For a graphic displaying the 20 neighborhoods with the highest CLP rates, see **Figure 12**.

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Figure 12
Prevalent and Incident Cases of Lead Poisoning for the Top 20
Neighborhoods in St. Louis, 2008



What Did City Programs Do in 2008?

Programmatic Activity

The childhood lead poisoning program in the City of St. Louis is a partnership of several City agencies. The Building Division, Community Development Administration, Department of Health, and the Problem Properties Court work together, performing various functions.

The majority of these functions revolve around issues of education, outreach, building inspections, hazard controls, enforcement, and securing funding for continuing or expanding existing programs.

Building Inspections and Lead Hazard Controls

The Lead Inspection and Hazard Control Section of the Building Division offers environmental investigations and remediation support. The unit consists of certified lead hazard inspectors, certified lead abatement workers and

data entry clerks. Lead inspections are performed on a request or on a referral basis from a variety of sources. The initiation for an inspection can occur in one of three ways.

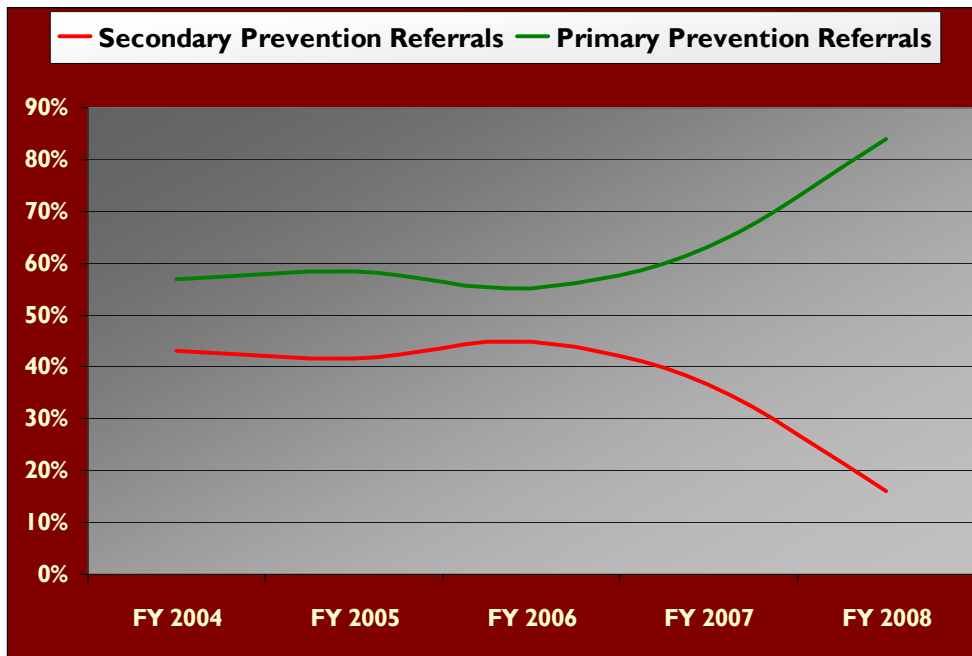
1. Any child under 6 years old found to have a **blood level of 10 µg/dl or greater** automatically initiates an inspection of the child's home;
2. **Legally required** inspections, such as the Housing Conservation District ordinance, which requires a visual inspection upon a residential sale or new rental tenant;
3. **Voluntary Requests from citizens** via the LSSL hotline or other numerous points of contact throughout the community.

When a lead inspection referral is initiated by an elevated blood lead level (EBL), efforts to inspect and remediate the home are considered *secondary prevention*, as a child has already been lead poisoned. Actions are designed to mitigate the effects and prevent future exposure. In 2004, nearly half of all

inspections were initiated by an EBL. Because the City has shifted its focus from one of reactive to proactive, *primary prevention* referrals now account for a large majority of inspection referrals. In 2008, 84 percent of referrals were *not* initiated by a lead poisoned child (**Figure 13**).

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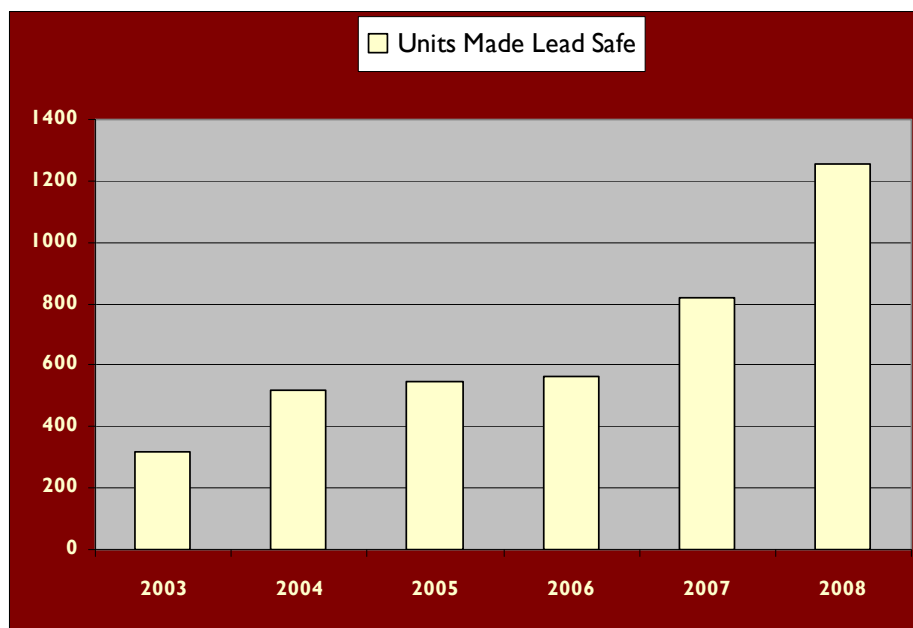
Figure 13
Lead Inspections by Referral Type, Fiscal Year 2004-2008



2008 also witnessed a dramatic increase in units made lead-safe. Remediation is the process by which lead hazards are fixed in a house. In 2008, 1,256 homes were made lead-safe via remediation.

The number of housing units made lead-safe has increased steadily over the past six years. However, between 2007 and 2008, the number increased by over 53 percent (Figure 14).

Figure 14
Housing Units Made Lead Safe via Hazard Controls, 2003-2008



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Courts

When lead hazards are not corrected within the specified time period, the property is referred to the Problem Properties Court for legal action. In 2008, 302 cases were arraigned for lead

hazard violations. This resulted in 34 properties being remediated via the judicial process and \$3,047.00 collected in fines (Figure 15).

Figure 15
Problem Properties Court Activity, 2006-2008

Arraigned Cases			Units Remediated via Courts			Fines Collected		
2006	2007	2008	2006	2007	2008	2006	2007	2008
286	451	302	16	19	34	\$3,807.00	\$7,860.50	\$3,047.00

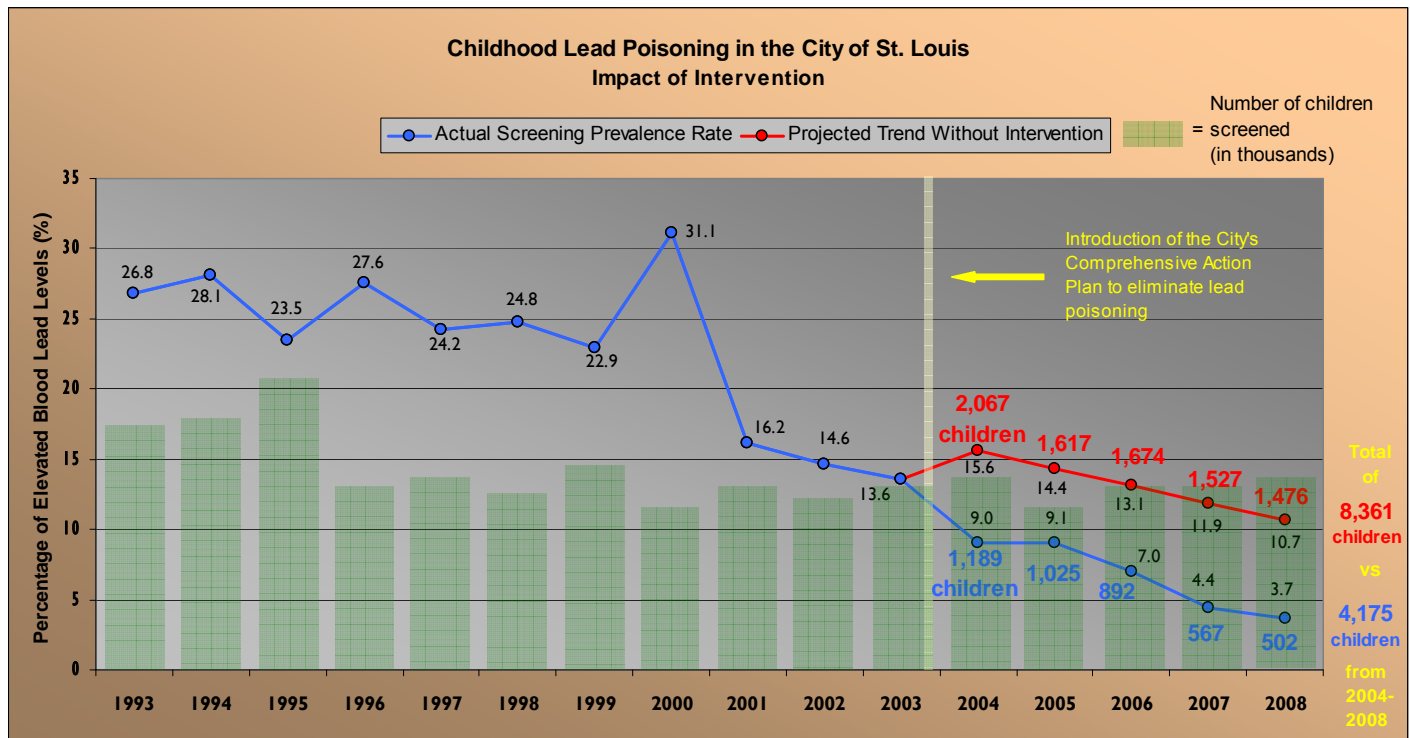
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Lead Safe St. Louis

2008 Accomplishments and Activities

Provided by Jeanine Arrighi, Program Director of Lead Safe Saint Louis

A remarkable reduction in childhood lead poisoning has occurred in the City of St. Louis since the inception of Mayor Francis G. Slay's "Comprehensive Action Plan to Eradicate Childhood Lead Poisoning in St. Louis by 2010". While the rate had been declining for a number of years, this program is probably responsible for preventing lead poisoning in over 4,000 children in from 2003 – 2008 (see figure below).



Data trends allow analysts to compare rates of disease over time. They also allow for future projections, from which to set priorities and create policy. A third way to apply trending is retrospective in nature. It can be used to assess the effectiveness of an historical effort by comparing actual rates to what rates could have been without such a program. The Comprehensive Action Plan to eliminate childhood lead poisoning (CLP) was introduced by Mayor Slay in November, 2003. Prior to its inception, rates of CLP had hovered in the mid-twenties until two dramatic swings brought the rates into the mid-teens. This trend analysis, which uses the method of least squares, returns values along a linear trend. Put another way, it uses the data points from 1993-2003 to project a trend line from 2004-2008 (the red line) to determine an approximation of what the rate would have been in the following years. This can then be compared to the *actual* prevalence rate of CLP (the blue line) to estimate program effectiveness. The trend analysis projects, without intervention, the rate of lead poisoning would be 10.7% in 2008, while the actual rate is 3.7%. The numbers in red and blue on the chart represent numbers of children with lead poisoning. For example, in 2008, 502 children were found to have elevated blood lead levels. The projected trend in red estimates the 2008 number would have been 1,476 without intervention. Also included are the green bars, which represent the number of children screened for CLP every year. With a population of approximately 30,000 children under the age of six, this number has remained relatively stable and represents an area to direct future outreach efforts.

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The successes achieved in the five years of the Lead Safe St. Louis initiative show the way to new opportunities to address healthy housing for the City of St. Louis.

- 🏠 **The Screening prevalence rate dropped to a record low of 3.7% of children with blood lead levels at or above 10 micrograms per deciliter (µg/dl), reflecting a 73% reduction over 2003's rate (and a 16% reduction over 2007's rate).**
- 🏠 **Only 77 children had blood lead levels at or above 20 µg/dl in 2008 compared to 217 in 2003.**
- 🏠 **Nearly 82% of children tested in 2008 had blood lead levels below 5 µg/dl compared to 52% in 2003.**
- 🏠 **Met HUD goals in all categories – attained Green Status entire year.**
- 🏠 **Building Division completed a record number of remediation projects – 1,256.**
- 🏠 **City programs exceeded HUD Benchmark Goal of 429 units by 238 units.**
- 🏠 **LSSL Hotline received a new record number of calls, as well as calls requesting lead inspections: 450 of 550 calls.**
- 🏠 **24 families were permanently relocated to lead safe homes in 2008.**

In addition to these successes, Lead Safe St. Louis:

- 🏠 Completed its Missouri Foundation for Health-funded **media campaign** in addition to production of a documentary film found at <http://stlouis.missouri.org/leadsafe/publicrelations.htm>. The campaign incorporated the branded images on billboards, bus shelters, incentive items, newspaper, television and radio ads, posters, event tents, brochures, and the Lead Safe Hero. The media campaign spread the Lead Safe St. Louis hotline number and website, increasing the reach of the program to thousands of St. Louis citizens, including those speaking other languages.
- 🏠 Continued proactive vs. reactive approach to inspection and remediation as units are processed on a **primary prevention** basis versus secondary prevention: 84% of requests for lead inspections were primary prevention, and 16% of requests resulted from a child with a blood lead level at or above 10 µg/dl (EBL) prior to request for service and EBL cases received priority response.
- 🏠 Celebrated the private/public partnerships introduced in 2007 at a ribbon-cutting event April 14, 2008, at **Winston Churchill Apartments**. This 8-story building was built in 1927 and contained 109 residential units. Around 2000, the property, occupied by many elderly residents, had management drug, and crime challenges. The police, neighbors, and



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the City Counselor intervened. There was a community hearing and the owner agreed



to sell the property. Eagle Point Enterprises, an affordable housing developer from Portland, ME, acquired the property in 2006. With funding from the Missouri Housing Development Commission, Centerline Capital Group, and the City of St. Louis, the property has been transformed into 102 lead-safe units, including 56 one-bedroom and 46 two-bedroom units. City Lead Inspection/Risk Assessment identified lead hazards that were controlled through the rehabilitation on all interior and exterior window units; all interior wood trim including doors, door frames, baseboards, cabinets and closets; interior walls and ceilings; and dust hazards on floors and windows. In addition to this project, more than 450 units were enrolled into

Window Replacement and Multi-Family Rehab Programs – both primary prevention programs.

- 🏠 Launched the new, state of the art, web-based system known as the “**Lead Housing Tracking**” database early in 2008 and made available in October for all participants in City’s Lead Program. Matt Ammon, Deputy Director of HUD’s Office of Healthy Homes and Lead Hazard Control, indicated that it was the most advanced database in the country when he visited St. Louis for the Winston Churchill Apartments ribbon cutting.
- 🏠 Showcased LSSL’s community collaborations by highlighting the innovative efforts of City Agencies to reduce childhood lead poisoning through primary prevention at two conferences in 2008: At the 2008 Indoor Environmental Health & Technologies and Lead and Healthy Homes Grantees Conference St. Louis presented “**Documenting and Measuring Program Effectiveness**” and “**Reaching Program Objectives through Public/Private/Nonprofit Collaboration**”. At the 2008 National Healthy Homes Conference three presentations made by St. Louis agencies included: “**Achieving Primary Prevention Through Public/Private Collaborations**”, “**Integrating Lead into Healthy Housing**”, and “**Marketing Health Messages to Non-English Speaking Populations**”.
- 🏠 Received Mayor Francis G. Slay’s prestigious “**Quality of Life Award**” at his annual Business Celebration Luncheon in September 2008.
- 🏠 Celebrated **Mayor’s Day** during Lead Safe Kids & Homes Week with the receipt of another \$7 million in funding from HUD’s Lead Hazard Control programs, at a property made lead safe through the Building Division and Community Development Administration’s Multifamily Lead Remediation Program. (In photo, left to right: Ruth Ann Norton, Executive Director of the Coalition to End Childhood Lead Poisoning; The contractor for the remediation project; Mayor Francis G. Slay; Pinkie Lekoa, Owner of the remediated multi-



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family unit; Alderman Terry Kennedy; and Matt Ammon, Deputy Director of HUD's Office of Healthy Housing and Lead Hazard Control.)

⌂ Provided another “**Contractor Appreciation Day**” during Lead Safe Kids & Homes Recognition in October and 100% of attendees employed by lead abatement contractors received free blood lead testing and a continental breakfast.

⌂ Continued partnership with BJC OB/GYN Clinic – **Heavy Metal Project** – where primary prevention referrals are made for Medicaid-insured pregnant women's homes to be remediated prior to birth of child. Volunteers and interns recruited 213 pregnant women for lead inspections. Daniel Berg, MD, MPH, founder of the Heavy Metal Project presented this program in his “Update on Childhood Lead Poisoning Prevention in St.

Louis” to pediatricians at Early Bird Rounds at St. Louis Children's Hospital during Lead Safe Kids and Homes Week in October.

⌂ Named the “Lead Safe Hero” designed exclusively for LSSL by Schweppe Studios through a contest launched by Mayor Slay at Lead Safe Kids and Homes Week's Mayors Day. In December 2008 “**Lino the Lead Safe Dino**” received his name from contest winner Narnia Yarborough in a presentation by the Mayor.



In December 2008 the Department of Health published a white paper entitled “**City of St. Louis Department of Health Healthy Homes Initiative Proposal**” advocating the expansion of the housing-based initiative

of the Lead Safe St. Louis program to address asthma triggers. Uncontrolled asthma accounts for hundreds of emergency department visits and hospitalizations, as well as deaths of children in St. Louis each year. Lead Safe St. Louis has now been enfolded into the Children's Environmental Health Program at the Department of Health to address these housing and environmental hazards.

Limitations and Discussion

Surveillance data are subject to limitations and the interpretations of the findings reported must be viewed with these limitations in mind. Children are not randomly tested for lead exposure. Screening for lead poisoning in the City of St. Louis is weighted towards those at greatest risk, and the rates in this report are likely higher than true population rates. True childhood lead poisoning prevalence and incidence rates require that all children at risk have an equal chance of selection into the population studied. Only 44% of St. Louis City children who are at risk of lead poisoning are included in the surveillance database. The missing 56% could represent children tested but not reported to the Health Department. However, it is more likely that the majority of children not appearing in the surveillance database were not screened for lead in 2008.

Traditionally in the City of St. Louis, children of lower socio-economic status are more likely to be screened for lead exposure than their affluent cohorts. This is largely due to the screening practices of experienced community health centers and because poor areas tend to be targeted for lead screening and education more than affluent areas

due to higher screening prevalence and incidence rates in underprivileged areas.

A screening rate of 44% in 2008, while encouraging and much higher than most areas of the country, indicates that private providers are still failing to screen children for lead poisoning in the City of St. Louis. Even though the prevalence of lead poisoning in the City of St. Louis appears to be on a continual decline, still not enough is known about whether the entire high-risk population is being reached.

Also, providers may choose not to test children in later years because they do not consider them to be at great risk. Dissemination of the aforementioned cohort study's two findings that (1) 8.1% of children retested in later years following a "negative" screening at age 2 were lead poisoned, and (2) 30% of children with undetectably low levels at these ages would later have a blood level of 5 µg/dl or greater, could mitigate the reluctance of some providers to test in later years.

The decreasing prevalence rate is extremely encouraging; however, certain areas of the City still have high rates and there is still much work to be done.

Summary

The rate of childhood lead poisoning in the City of St. Louis decreased again to an all-time low of 3.7% in 2008. This is due to the efforts of several City agencies as well as numerous private partnerships, aimed at the facilitation of outreach, education, policy and collaboration.

While the City has had many successes in combating childhood lead poisoning, universal screening remains a hurdle. Less than half of City children under 6 years of age were screened for lead poisoning in 2008. This figure represents negligence on behalf of healthcare providers and pediatric physicians. Failure to screen all of their patients less than 6 years of age must be remedied. The entire City of St. Louis is designated “high-risk.” As such, guidelines call for universal testing of children through age 6.

On the positive side, providers in the City of St. Louis did screen the most children since 1999. This large number is due, in part, to a new program in 2008 designed to increase the number of children screened for lead poisoning. Five nurses and five health educators were hired to work in various aspects of the City’s lead program. They were charged with developing innovative methods to reach out to physicians, community leaders, and parents in order to stress the importance of universal screening. Their efforts are currently being evaluated to determine which programs were most effective at increasing awareness and ultimately screenings for childhood lead poisoning.

Until all City children receive the recommended annual screening from

their primary health care provider, surveillance data will not reflect a true picture of childhood lead poisoning in the City of St. Louis. That picture would undoubtedly be one of a healthier environment for our children, as more children screened would result in a wider net cast to find children exposed to lead, mitigate its effects, and prevent further exposure.

The preferred remedy for the lead poisoning problem is to prevent children from ever being poisoned in the first place through primary prevention. Methods include providing lead-safe homes and play areas, educating people about lead hazards and how to protect children from them, and improving childhood nutrition to prevent the absorption of lead by their bodies.

When we cannot prevent initial lead poisoning, we must turn to the second best method for controlling the problem, secondary prevention. This is the early detection and treatment of poisoned children and the removal or reduction of lead hazards from their environment. Early detection and treatment can help health care providers reduce a child’s lead body burden and can help the community and parents identify lead hazards and work to remove them. However, early detection is possible only if children receive lead tests.

Since the majority of our children still do not receive lead tests, we must assume that many health care providers and families are still uninformed about the risks and long-term effects of lead poisoning.

Data Tables

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Table 1
Childhood Lead Poisoning Rates, 1971-2008

Lead Poisoning				Lead Poisoning			
Year	Threshold	# Screened	% Positive	Year	Threshold	# Screened	% Positive
1971	40 µg/dl	4,334	28.0%	1990	25 µg/dl	12,202	6.5%
1972	40 µg/dl	1,819	34.0%	1991	25 µg/dl	12,799	4.4%
1973	40 µg/dl	7,426	32.3%	1992	10 µg/dl	17,715	48.5%
1974	40 µg/dl	5,835	27.0%	1993	10 µg/dl	17,850	26.8%
1975	40 µg/dl	11,041	22.9%	1994	10 µg/dl	18,541	28.1%
1976	30 µg/dl	13,246	28.0%	1995	10 µg/dl	20,573	23.5%
1977	30 µg/dl	14,375	24.5%	1996	10 µg/dl	13,305	27.6%
1978	30 µg/dl	13,687	15.2%	1997	10 µg/dl	13,833	24.2%
1979	30 µg/dl	12,511	12.5%	1998	10 µg/dl	13,205	24.8%
1980	30 µg/dl	12,469	11.4%	1999	10 µg/dl	14,580	22.9%
1981	30 µg/dl	11,449	12.4%	2000	10 µg/dl	11,260	31.1%
1982	30 µg/dl	11,778	10.9%	2001	10 µg/dl	12,743	16.2%
1983	30 µg/dl	11,406	7.6%	2002	10 µg/dl	11,497	14.6%
1984	30 µg/dl	12,982	8.2%	2003	10 µg/dl	12,011	13.6%
1985	30 µg/dl	12,308	11.0%	2004	10 µg/dl	13,249	9.0%
1986	25 µg/dl	11,324	16.4%	2005	10 µg/dl	11,227	9.1%
1987	25 µg/dl	13,314	10.3%	2006	10 µg/dl	12,779	7.0%
1988	25 µg/dl	14,364	9.1%	2007	10 µg/dl	12,836	4.4%
1989	25 µg/dl	12,317	7.4%	2008	10 µg/dl	13,634	3.7%

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Table 2
Healthcare Providers of Blood Lead Screenings, 2006-2008

Provider	Number Screened			Percent of Total Screened			Number ≥ 10 $\mu\text{g/dl}$			SPR (%)			New Cases			SIR (%)		
	2006	2007	2008	2006	2007	2008	2006	2007	2008	2006	2007	2008	2006	2007	2008	2006	2007	2008
St. Louis City Health Department	1,602	1,190	1,591	12.5%	9.3%	11.7%	70	35	26	4.4	2.9	1.6	31	25	23	2.1	2.2	1.5
ConnectCare/CHC's*	5,466	6,075	6,285	42.8%	47.3%	46.1%	494	332	332	9.0	5.5	5.3	266	190	210	5.4	3.5	3.6
Hospitals	1,549	1,525	1,725	12.1%	11.9%	12.7%	102	70	48	6.6	4.6	2.8	75	44	32	5.3	3.1	1.9
Group Practice/Private Physician	4,133	4,038	4,002	32.3%	31.5%	29.4%	222	130	94	5.4	3.2	2.3	136	86	68	2.5	2.2	1.8
Other Categories	29	8	31	0.2%	0.1%	0.2%	4	0	2	13.8	0.0	6.5	4	0	1	3.6	0.0	3.6
Grand Total	12,779	12,836	13,634	100.0%	100.0%	100.0%	892	567	502	7.0	4.4	3.7	512	345	334	4.0	2.9	2.6

*Community Health Centers

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Table 3
Childhood Lead Poisoning by ZIP Code, 2008

ZIP Code	Population ≤6 Years	Number Screened	Percent Screened	Number ≥ 10 µg/dl	SPR (%)	New Cases	SIR (%)	Total Housing Units	Percent Vacant	Percent Occupied	Percent Owner Occupied	Percent Renter Occupied
63115	2,282	1136	49.8%	78	6.9	49	4.7	12,421	19.5	80.5	55.3	44.7
63107	1,581	829	52.4%	52	6.3	37	4.9	7,929	28.7	71.3	44.8	55.2
63113	1,417	660	46.6%	39	5.9	28	4.6	8,540	26.4	73.6	46.9	53.1
63120	1,289	640	49.7%	36	5.6	21	3.6	4,848	18.5	81.5	58.5	41.5
63112	1,923	997	51.8%	45	4.5	31	3.3	12,574	20.1	79.9	35.5	64.5
63118	3,364	1523	45.3%	64	4.2	45	3.2	15,326	25.6	74.4	37.4	62.6
63108	847	334	39.4%	13	3.9	11	3.4	11,675	13.2	86.8	26.7	73.3
63147	1,019	531	52.1%	19	3.6	10	2.0	5,071	12.6	87.4	66.8	33.2
63110	1,932	632	32.7%	21	3.3	14	2.3	10,179	17.8	82.2	39.3	60.7
63104	2,189	863	39.4%	24	2.8	13	1.6	9,847	18.6	81.4	36.4	63.6
63116	4,571	1839	40.2%	46	2.5	32	1.8	22,844	10.3	89.7	57.9	42.1
63101	138	46	33.3%	1	2.2	1	2.3	730	41.2	58.8	7.2	92.8
63111	2,111	993	47.0%	20	2.0	14	1.5	10,508	16.3	83.7	44.7	55.3
63106	1,559	895	57.4%	18	2.0	12	1.4	6,250	32.0	68.0	13.3	86.7
63109	2,336	679	29.1%	9	1.3	5	0.8	15,042	4.5	95.5	61.8	38.2
63139	1,739	442	25.4%	1	0.2	1	0.2	12,344	6.3	93.7	61.3	38.7
63102	30	19	63.3%	0	0.0	0	0.0	870	24.8	75.2	2.1	97.9
63103	172	51	29.7%	0	0.0	0	0.0	3,609	18.6	81.4	1.3	98.7
Fringe ZIPs	931	418	44.9%	15	3.6	9	2.3	5,747	8.0	92.0	66.5	33.5
Unknown	-	107	-	1	0.9	1	1.0	-	-	-	-	-
City Total	31,430	13,634	43.4%	502	3.7	334	2.6	176,354	16.6	83.4	46.9	53.1

*ZIP codes with small populations of children under 6 should be interpreted with caution.

**Fringe Zips are those on the western edge of the City that overlap a small part of the City from the County.

***Population estimates are based on a 2008 estimate from Claritas, Inc.

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Table 4
Childhood Lead Poisoning by Ward, 2008

Ward	Population <6 Years	Number Screened	Percent Screened	Number ≥ 10 µg/dl	SPR (%)	New Cases	SIR (%)	Total Housing Units	Percent Vacant	Percent Occupied	Percent Owner Occupied	Percent Renter Occupied
Ward - 21	956	574	60.0%	39	6.8	29	5.4	5,899	16.8	83.2	54.9	45.1
Ward - 01	940	545	58.0%	35	6.4	18	3.6	5,735	19.4	80.6	58.3	41.7
Ward - 18	750	487	64.9%	29	6.0	24	5.2	6,522	21.5	78.5	38.0	62.0
Ward - 03	908	622	68.5%	37	5.9	27	4.8	5,670	28.9	71.1	44.3	55.7
Ward - 22	795	685	86.2%	39	5.7	25	4.0	5,585	24.5	75.5	46.8	53.2
Ward - 04	793	480	60.5%	27	5.6	20	4.5	6,321	25.2	74.8	47.2	52.8
Ward - 27	900	580	64.4%	31	5.3	17	3.2	4,669	12.8	87.2	71.6	28.4
Ward - 20	907	754	83.1%	40	5.3	29	4.2	5,693	28.4	71.6	37.5	62.5
Ward - 09	1,316	522	39.7%	22	4.2	14	2.9	7,048	22.7	77.3	36.2	63.8
Ward - 26	870	584	67.1%	23	3.9	18	3.2	6,361	21.9	78.1	35.6	64.4
Ward - 02	1,027	516	50.2%	20	3.9	9	1.9	4,863	15.6	84.4	60.1	39.9
Ward - 17	682	337	49.4%	13	3.9	8	2.5	7,491	17.3	82.7	25.0	75.0
Ward - 19	693	374	54.0%	14	3.7	9	2.5	5,198	22.5	77.5	16.6	83.4
Ward - 14	1,310	480	36.6%	15	3.1	10	2.2	5,874	8.3	91.7	55.6	44.4
Ward - 15	1,168	581	49.7%	18	3.1	13	2.3	6,437	13.8	86.2	45.8	54.2
Ward - 07	1,097	426	38.8%	13	3.1	5	1.2	7,926	23.4	77.6	23.6	76.4
Ward - 28	544	164	30.1%	5	3.0	3	1.9	7,803	9.6	90.4	32.5	67.5
Ward - 25	1,365	752	55.1%	19	2.5	12	1.7	6,348	17.2	82.8	41.6	58.4
Ward - 11	1,123	503	44.8%	12	2.4	9	1.8	6,198	14.7	85.3	53.5	46.5
Ward - 05	1,224	825	67.4%	19	2.3	11	1.4	6,878	32.6	67.4	19.9	80.1
Ward - 06	1,101	627	56.9%	11	1.8	9	1.5	6,314	19.8	80.2	37.4	62.6
Ward - 08	1,279	360	28.1%	6	1.7	4	1.2	6,488	15.4	84.6	37.6	63.4
Ward - 13	1,389	435	31.3%	6	1.4	3	0.7	5,987	8.4	91.6	65.3	34.7
Ward - 24	832	225	27.0%	3	1.3	3	1.4	6,819	7.3	92.7	58.5	41.5
Ward - 10	1,464	323	22.1%	4	1.2	3	1.0	6,996	8.9	91.1	46.9	53.1
Ward - 16	1,034	232	22.4%	1	0.4	1	0.4	6,490	3.0	97.0	69.0	31.0
Ward - 12	940	270	28.7%	0	0.0	0	0.0	6,476	4.4	95.6	70.6	29.4
Ward - 23	962	264	27.4%	0	0.0	0	0.0	6,265	4.0	96.0	76.5	23.5
Not geocoded	-	107	-	1	0.9	1	1.0	-	-	-	-	-
City Total	28,369	13,634	48.1%	502	3.7	334	2.6	176,354	16.6	83.4	46.9	53.1

***Population estimates are based on the 2000 Census

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Table 5
Childhood Lead Poisoning by Neighborhood, 2008

Neighborhood Number	Neighborhood	Population <6 Years	Number Screened	Percent Screened	Number ≥ 10 µg/dl	SPR (%)	New Cases	SIR (%)	Total Housing Units	Percent Vacant	Percent Occupied	Percent Owner Occupied	Percent Renter Occupied
45	Wydown/Slinker	26	9	34.6%	1	11.1	1	11.1	727	9.2	90.8	46.1	53.9
23	McKinley Heights	236	69	29.2%	7	10.1	4	6.2	1,101	23.5	76.5	26.7	73.3
51	Academy	284	157	55.3%	15	9.6	11	7.7	1,729	27.6	72.4	53.8	46.2
68	O'Fallon	625	324	51.8%	28	8.6	21	7.1	3,269	18.5	81.5	52.3	47.7
54	Lewis Place	155	109	70.3%	9	8.3	6	6.0	1,045	27.6	72.4	46.6	53.4
78	Hamilton Heights	359	203	56.5%	16	7.9	12	6.5	1,852	26.0	74.0	49.5	50.5
72	Walnut Park East	456	277	60.7%	20	7.2	11	4.5	2,111	19.0	81.0	64.1	35.9
67	Fairground Neighborhood	215	140	65.1%	10	7.1	7	5.5	1,216	28.8	71.2	47.7	52.3
56	The Greater Ville	688	356	51.7%	24	6.7	20	6.0	4,221	23.7	76.3	48.8	51.2
19	Gravois Park	686	342	49.9%	23	6.7	16	5.2	2,818	28.2	71.8	65.7	34.3
71	Mark Twain	420	225	53.6%	15	6.7	8	3.8	2,281	22.2	77.8	35.9	64.1
30	Benton Park West	647	291	45.0%	19	6.5	14	5.3	2,540	26.7	73.3	73.4	26.6
65	Hyde Park	426	194	45.5%	12	6.2	9	5.2	1,767	29.2	70.8	35.2	64.8
39	Forest Park Southeast	341	153	44.9%	9	5.9	6	4.2	1,831	23.0	77.0	34.3	65.7
70	Mark Twain/I-70 Industrial	51	51	100.0%	3	5.9	3	6.3	393	7.9	92.1	86.5	13.5
69	Penrose	545	336	61.7%	19	5.7	8	2.6	3,565	15.1	84.9	61.0	39.0
60	St. Louis Place	257	185	72.0%	10	5.4	7	4.1	1,395	33.3	66.7	39.9	60.1
53	Fountain Park	160	93	58.1%	5	5.4	5	5.7	1,010	25.2	74.8	32.0	68.0
55	Kingsway East	364	172	47.3%	9	5.2	7	4.4	2,162	19.6	80.4	52.0	48.0
10	Ellendale	137	39	28.5%	2	5.1	2	5.3	756	9.0	91.0	68.6	31.4
50	Wells/Goodfellow	790	485	61.4%	24	4.9	14	3.1	4,063	26.7	73.3	46.3	53.7
76	Walnut Park West	342	224	65.5%	11	4.9	5	2.4	1,592	11.2	88.8	72.2	27.8
28	McRee Town	289	62	21.5%	3	4.8	2	3.4	824	34.6	65.4	21.7	78.3
24	Fox Park	384	160	41.7%	7	4.4	3	2.0	1,549	29.8	71.1	36.7	63.3
57	The Ville	211	95	45.0%	4	4.2	3	3.5	1,492	26.9	73.1	35.7	64.3
58	Vandeventer	182	95	52.2%	4	4.2	3	3.4	1,183	28.8	71.2	50.1	49.9
31	The Gate District	343	198	57.7%	8	4.0	7	3.6	1,636	17.2	82.8	35.7	64.3
52	Kingsway West	260	149	57.3%	6	4.0	4	3.0	1,978	18.7	81.3	45.9	54.1

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Neighborhood Number	Neighborhood	Population <6 Years	Number Screened	Percent Screened	Number ≥ 10 µg/dl	SPR (%)	New Cases	SIR (%)	Total Housing Units	Percent Vacant	Percent Occupied	Percent Owner Occupied	Percent Renter Occupied
59	JeffVanderLou	561	327	58.3%	13	4.0	11	3.6	3,463	28.0	72.0	34.5	65.5
74	Baden	695	430	61.9%	17	4.0	8	2.0	3,697	13.9	86.1	56.6	43.4
22	Benton Park	336	105	31.3%	4	3.8	4	4.0	2,377	26.2	73.8	42.3	57.7
66	College Hill	313	164	52.4%	6	3.7	2	1.3	1,342	31.5	68.5	45.6	54.4
48	West End	635	390	61.4%	14	3.6	11	3.0	3,347	21.8	72.8	29.9	70.1
7	South Hampton	648	208	32.1%	7	3.4	4	2.0	3,675	5.3	94.7	66.3	33.7
63	Old North St. Louis	241	157	65.1%	5	3.2	1	0.7	1,036	41.5	58.5	21.1	78.9
16	Dutchtown	1808	1051	58.1%	33	3.1	22	2.2	8,447	18.8	81.2	41.3	58.7
27	Shaw	811	260	32.1%	8	3.1	5	2.0	3,802	17.9	82.1	38.9	61.1
15	Tower Grove South	1270	586	46.1%	18	3.1	13	2.3	7,308	13.6	86.4	47.7	52.3
77	Covenant Blu/Grand Center	237	131	55.3%	4	3.1	1	0.8	1,721	27.3	72.7	11.4	88.6
1	Carondelet	828	433	52.3%	12	2.8	8	1.9	4,730	15.4	84.6	51.8	48.2
46	Skinker/DeBaliviere	244	83	34.0%	2	2.4	0	0.0	2,348	10.3	89.7	58.5	41.5
5	Bevo Mill	1153	489	42.4%	11	2.2	8	1.7	5,984	7.9	92.1	63.7	36.3
43	Franz Park	172	47	27.3%	1	2.1	1	2.2	1,318	7.7	92.3	66.6	33.4
18	Marine Villa	296	167	56.4%	3	1.8	2	1.3	1,576	25.4	74.6	39.5	60.5
2	Patch	236	113	47.9%	2	1.8	2	1.8	1,513	18.8	81.2	50.7	49.3
38	Central West End	451	178	39.5%	3	1.7	3	1.7	9,572	11.3	88.7	25.7	74.3
47	DeBaliviere Place	153	61	39.9%	1	1.6	1	1.6	2,409	14.3	85.7	18.0	82.0
73	North Point	261	139	53.3%	2	1.4	2	1.5	1,648	3.4	96.6	83.7	16.3
29	Tiffany	135	79	58.5%	1	1.3	1	1.3	571	12.3	87.7	25.2	74.8
34	Lasalle	158	85	53.8%	1	1.2	0	0.0	650	6.8	93.2	28.0	72.0
62	Columbus Square	285	87	30.5%	1	1.1	1	1.2	1,236	37.2	62.8	7.0	93.0
3	Holly Hills	317	99	31.2%	1	1.0	0	0.0	1,887	8.1	91.9	58.4	41.6
17	Mount Pleasant	399	202	50.6%	2	1.0	0	0.0	2,281	14.9	85.1	30.5	69.5
14	North Hampton	520	233	44.8%	2	0.9	1	0.4	4,524	5.4	94.6	47.5	52.5
33	Peabody, Darst, Webbe	310	261	84.2%	2	0.8	1	0.4	779	28.1	71.9	3.4	96.6

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25	Tower Grove East	693	262	37.8%	1	0.4	0	0.0	3,485	20.6	79.4	38.5	61.5
61	Carr Square	349	280	80.2%	1	0.4	1	0.4	1,327	25.7	74.3	99.4	0.6
4	Boulevard Heights	558	185	33.2%	0	0.0	0	0.0	4,093	3.8	92.2	84.5	15.5
6	Princeton Heights	608	203	33.4%	0	0.0	0	0.0	4,033	5.4	94.6	68.7	31.3
8	St. Louis Hills	451	109	24.2%	0	0.0	0	0.0	4,077	3.3	96.7	57.1	42.9
9	Lindenwood Park	687	199	29.0%	0	0.0	0	0.0	5,032	4.2	95.8	29.3	70.7
11	Clifton Heights	263	67	25.5%	0	0.0	0	0.0	1,642	6.8	93.2	74.9	25.1
12	The Hill	157	30	19.1%	0	0.0	0	0.0	1,486	6.8	93.2	66.2	33.8
13	Southwest Garden	334	94	28.1%	0	0.0	0	0.0	3,188	10.4	89.6	42.8	57.2
20	Kosciusko	0	2	INF	0	0.0	0	0.0	-	-	-	-	-
21	Soulard	162	35	21.6%	0	0.0	0	0.0	2,216	17.6	82.4	27.7	72.3
26	Compton Heights	98	32	32.7%	0	0.0	0	0.0	688	11.8	88.2	64.7	35.3
32	Lafayette Square	109	32	29.4%	0	0.0	0	0.0	1,007	11.8	86.2	34.7	65.3
35	Downtown	11	26	236.4%	0	0.0	0	0.0	1,050	34.9	65.1	0.9	99.1
36	Downtown West	36	33	91.7%	0	0.0	0	0.0	2,073	20.2	79.8	1.4	98.6
37	Midtown	65	14	21.5%	0	0.0	0	0.0	1,532	18.9	81.1	1.2	98.8
40	Kings Oak	17	8	47.1%	0	0.0	0	0.0	113	11.5	86.5	59.0	41.0
41	Cheltenham	21	5	23.8%	0	0.0	0	0.0	262	10.3	89.7	54.5	45.5
42	Clayton/Tamm	127	33	26.0%	0	0.0	0	0.0	1,436	7.2	92.8	52.9	47.1
44	Hi-Point	128	36	28.1%	0	0.0	0	0.0	1,331	5.6	94.4	48.8	51.2
49	Visitation Park	79	56	70.9%	0	0.0	0	0.0	576	15.3	84.3	22.1	77.9
64	Near North Riverfront	25	12	48.0%	0	0.0	0	0.0	157	52.2	47.8	36.0	64.0
75	Riverview	18	16	88.9%	0	0.0	0	0.0	96	8.2	91.8	78.9	21.1
79	North Riverfront	21	0	0.0%	0	0.0	0	0.0	107	27.1	72.9	52.6	47.4
	Not geocoded	-	107	-	1	0.9	1	1.0	-	-	-	-	-
City Total		28,369	13,634	48.1%	502	3.7	334	2.6	176,354	16.6	83.4	46.9	53.1

* Neighborhoods with small populations of children under 6 appear to have high screening prevalence rates due to fewer children screened.

** Percent screened may exceed 100% due to use of 2000 Census population data.

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Table 6
Childhood Lead Poisoning by Census Tract, 2008

Census Tract	Population <6 Years	Number Screened	Percent Screened	Number ≥ 10 µg/dl	SPR (%)	New Cases	SIR (%)	Total Housing Units	Percent Vacant	Percent Occupied	Percent Owner Occupied	Percent Renter Occupied
101100	225	53	23.6%	0	0.0	0	0.0	1,211	3.5	96.5	91.3	8.7
101200	224	71	31.7%	0	0.0	0	0.0	1,494	2.6	97.4	83.5	16.5
101300	457	122	26.7%	2	1.6	1	0.8	2,207	6.6	93.4	66.4	33.6
101400	262	119	45.4%	6	5.0	4	3.5	1,411	10.6	89.4	60.4	39.6
101500	326	140	42.9%	2	1.4	2	1.4	1,708	17.2	82.8	45.6	54.4
101800	291	148	50.9%	4	2.7	3	2.1	1,658	20.5	79.5	48.6	51.4
102100	212	60	28.3%	0	0.0	0	0.0	1,748	5.8	94.2	40.4	59.6
102200	484	116	24.0%	0	0.0	0	0.0	3,095	3.7	96.3	80.5	19.5
102300	132	36	27.3%	0	0.0	0	0.0	930	4.0	96.0	86.3	13.7
102400	251	82	32.7%	0	0.0	0	0.0	1,211	7.4	92.6	63.0	37.0
102500	196	53	27.0%	0	0.0	0	0.0	1,047	6.5	93.5	70.3	29.7
103100	216	69	31.9%	0	0.0	0	0.0	1,819	2.7	97.3	52.0	48.0
103400	202	37	18.3%	0	0.0	0	0.0	971	4.7	95.3	73.7	26.3
103600	154	25	16.2%	0	0.0	0	0.0	702	4.6	95.4	72.1	27.9
103700	218	52	23.9%	0	0.0	0	0.0	1,461	8.1	91.9	68.1	31.9
103800	318	78	24.5%	0	0.0	0	0.0	1,883	3.9	96.1	81.1	18.9
103900	100	24	24.0%	2	8.3	2	8.3	496	9.5	90.5	75.7	24.3
104100	202	53	26.2%	1	1.9	1	2.0	1,453	8.3	91.7	63.8	36.2
104200	225	48	21.3%	0	0.0	0	0.0	2,091	5.8	94.2	50.3	49.7
104500	105	34	32.4%	0	0.0	0	0.0	1,051	9.2	90.8	53.9	46.1
105100	178	38	21.3%	1	2.6	1	2.6	2,054	10.0	90.0	39.1	60.9
105200	192	72	37.5%	2	2.8	0	0.0	1,629	11.7	88.3	34.1	65.9
105300	261	131	50.2%	5	3.8	3	2.4	1,362	20.9	79.1	25.0	75.0

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105400	324	193	59.6%	4	2.1	4	2.2	1,110	27.4	72.6	23.7	76.3
105500	215	132	61.4%	6	4.5	5	3.9	1,518	20.9	79.1	48.0	52.0
106100	297	148	49.8%	12	8.1	8	6.7	1,390	24.5	75.5	49.5	50.5
106200	302	193	63.9%	8	4.1	5	2.9	1,239	30.7	69.3	37.6	62.4
106300	307	139	45.3%	10	7.2	5	3.9	1,411	21.5	78.5	46.9	53.1
106400	243	141	58.0%	7	5.0	5	3.9	1,715	24.8	75.2	48.7	51.3
106500	247	161	65.2%	5	3.1	3	2.0	1,676	20.6	79.4	48.7	51.3
106600	229	123	53.7%	11	8.9	9	7.8	1,208	27.4	72.6	47.8	52.2
106700	378	170	45.0%	9	5.3	7	4.5	2,162	19.6	80.4	52.0	48.0
107100	63	51	81.0%	3	5.9	3	6.3	393	7.9	92.1	86.5	13.5
107200	167	88	52.7%	6	6.8	1	1.3	707	19.2	80.8	57.1	42.9
107300	514	283	55.1%	12	4.2	6	2.3	2,289	9.0	91.0	74.8	25.2
107400	337	189	56.1%	14	7.4	10	5.9	1,404	18.9	81.1	67.6	32.4
107500	368	161	43.8%	12	7.5	6	4.1	1,064	16.3	83.7	68.5	31.5
107600	193	120	62.2%	9	7.5	4	3.5	1,222	27.2	72.8	57.3	42.7
107700	355	179	50.4%	10	5.6	5	3.0	2,067	13.7	86.3	62.2	37.8
108100	327	191	58.4%	11	5.8	4	2.2	1,526	11.4	88.6	73.9	26.1
108200	208	94	45.2%	0	0.0	0	0.0	1,240	8.1	91.9	61.1	38.9
108300	240	123	51.3%	3	2.4	3	2.5	1,083	9.9	90.1	71.5	28.5
108400	115	78	67.8%	2	2.6	0	0.0	557	14.9	85.1	39.2	60.8
108500	72	40	55.6%	2	5.0	2	5.3	365	27.4	72.6	36.2	63.8
109600	412	163	39.6%	14	8.6	12	8.0	1,832	15.0	85.0	51.7	48.3
109700	417	215	51.6%	8	3.7	3	1.5	1,899	32.9	67.1	45.2	54.8
110100	338	172	50.9%	8	4.7	5	3.0	1,779	19.5	80.5	58.6	41.4
110200	328	166	50.6%	12	7.2	10	6.5	1,592	21.1	78.9	52.1	47.9

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110300	270	135	50.0%	8	5.9	6	4.8	1,744	23.9	76.1	46.6	53.4
110400	265	140	52.8%	14	10.0	11	8.7	1,554	23.9	76.1	49.0	51.0
110500	185	126	68.1%	11	8.7	7	6.2	1,038	29.6	70.4	46.9	53.1
111100	176	85	48.3%	4	4.7	1	1.3	962	29.4	70.6	48.9	51.1
111200	151	71	47.0%	5	7.0	4	6.3	1,098	34.4	65.6	44.0	56.0
111300	201	82	40.8%	3	3.7	3	4.1	1,279	28.1	71.9	36.2	63.8
111400	165	96	58.2%	4	4.2	3	3.3	1,129	29.8	70.2	47.7	52.3
111500	136	50	36.8%	3	6.0	1	2.2	670	27.0	73.0	44.2	55.8
112100	200	65	32.5%	2	3.1	2	3.1	2,753	12.8	87.2	29.4	70.6
112200	176	89	50.6%	9	10.1	7	8.8	990	22.0	78.0	40.2	59.8
112300	244	161	66.0%	9	5.6	8	5.3	1,494	25.0	75.0	39.3	60.7
112400	128	50	39.1%	1	2.0	1	2.0	2,687	9.2	90.8	23.5	76.5
113100	180	49	27.2%	0	0.0	0	0.0	1,784	6.7	93.3	46.6	53.4
113400	82	22	26.8%	0	0.0	0	0.0	509	11.4	88.6	49.0	51.0
113500	171	30	17.5%	0	0.0	0	0.0	1,408	7.0	93.0	67.0	33.0
114100	714	242	33.9%	4	1.7	2	0.9	4,925	5.2	94.8	49.3	50.7
114200	368	122	33.2%	0	0.0	0	0.0	2,698	4.8	95.2	62.7	37.3
114300	609	161	26.4%	5	3.1	3	1.9	2,770	4.5	95.5	74.0	26.0
115100	372	133	35.8%	5	3.8	4	3.1	1,962	6.9	93.1	58.2	41.8
115200	399	190	47.6%	5	2.6	4	2.2	1,699	10.3	89.7	37.0	63.0
115300	711	294	41.4%	4	1.4	0	0.0	2,578	14.5	85.5	62.3	37.7
115400	342	122	35.7%	3	2.5	1	0.9	1,413	10.3	89.7	68.2	31.8
115500	670	341	50.9%	6	1.8	5	1.5	2,987	17.2	82.8	45.3	54.7
115600	515	259	50.3%	2	0.8	0	0.0	2,745	15.0	85.0	32.7	67.3
115700	404	243	60.1%	8	3.3	4	1.7	1,890	19.4	80.6	38.3	61.7

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116100	341	159	46.6%	3	1.9	2	1.3	1,768	11.1	88.9	50.5	49.5
116200	520	149	28.7%	4	2.7	3	2.1	2,458	14.2	85.8	51.3	48.7
116300	543	334	61.5%	16	4.8	14	4.5	3,207	15.3	84.7	37.5	62.5
116400	611	319	52.2%	15	4.7	10	3.5	2,483	23.3	76.7	36.6	63.4
116500	505	169	33.5%	3	1.8	2	1.3	2,266	22.0	78.0	39.2	60.8
117100	108	40	37.0%	2	5.0	1	2.7	1,181	15.3	84.7	20.5	79.5
117200	814	236	29.0%	7	3.0	4	1.8	3,155	19.6	80.4	36.1	63.9
117300	317	156	49.2%	6	3.8	5	3.3	1,487	16.9	83.1	36.0	64.0
117400	480	132	27.5%	1	0.8	0	0.0	2,330	16.4	83.6	43.4	56.6
118100	263	93	35.4%	2	2.2	2	2.3	994	33.0	67.0	34.5	65.5
118400*	23	4	17.4%	0	0.0	0	0.0	953	17.3	82.7	0.9	99.1
118500	107	26	24.3%	0	0.0	0	0.0	363	17.4	82.6	56.3	43.7
118600	225	87	38.7%	7	8.0	4	5.1	1,291	20.3	79.7	34.2	65.8
119100	182	49	26.9%	1	2.0	1	2.0	4,483	11.1	88.9	23.3	76.7
119200	100	34	34.0%	0	0.0	0	0.0	960	22.6	77.4	45.5	54.5
119300	135	43	31.9%	0	0.0	0	0.0	1,324	13.6	86.4	4.5	95.5
120100	61	45	73.8%	1	2.2	0	0.0	503	30.6	69.4	37.0	63.0
120200	164	68	41.5%	3	4.4	2	3.3	543	21.5	78.5	38.7	61.3
120300	216	114	52.8%	8	7.0	5	4.7	916	34.3	65.7	40.2	59.8
121100	95	99	104.2%	0	0.0	0	0.0	865	10.8	89.2	1.6	98.4
121200	349	125	35.8%	3	2.4	3	2.5	1,477	33.2	66.8	7.6	92.4
121300	166	69	41.6%	3	4.3	3	4.4	613	30.8	69.2	7.3	92.7
121400*	27	6	22.2%	0	0.0	0	0.0	143	37.8	62.2	3.4	96.6
122100	228	103	45.2%	1	1.0	1	1.0	864	11.7	88.3	38.5	61.5
122200*	0	8	INF	0	0.0	0	0.0	2	0.0	100.0	50.0	50.0

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Census Tract	Population <6 Years	Number Screened	Percent Screened	Number ≥ 10 µg/dl	SPR (%)	New Cases	SIR (%)	Total Housing Units	Percent Vacant	Percent Occupied	Percent Owner Occupied	Percent Renter Occupied
122400	523	301	57.6%	3	1.0	1	0.3	1,088	17.3	82.7	22.1	77.9
123100	452	183	40.5%	11	6.0	7	4.1	1,973	26.1	73.9	39.5	60.5
123200	201	76	37.8%	3	3.9	1	1.4	1,193	20.2	79.8	36.9	63.1
123300	312	79	25.3%	6	7.6	5	6.6	1,716	20.9	79.1	34.9	65.1
123400	172	44	25.6%	0	0.0	0	0.0	2,070	16.6	83.4	27.1	72.9
123500*	0	2	INF	0	0.0	0	0.0	-	-	-	-	-
124100	605	293	48.4%	20	6.8	14	5.3	2,645	30.2	69.8	35.1	64.9
124200	511	223	43.6%	13	5.8	10	4.9	1,918	28.0	72.0	33.2	66.8
124300	300	96	32.0%	3	3.1	2	2.2	2,145	27.4	72.6	41.5	58.5
124600	256	138	53.9%	2	1.4	2	1.5	1,023	26.6	73.4	41.7	58.3
125500	49	21	42.9%	0	0.0	0	0.0	1,963	19.1	80.9	1.3	98.7
125600	117	54	46.2%	1	1.9	1	1.9	1,310	29.3	70.7	0.5	99.5
125700	529	282	53.3%	0	0.0	0	0.0	1,795	35.7	64.3	5.1	94.9
126600	343	232	67.6%	6	2.6	2	0.9	1,534	38.9	61.1	28.1	71.9
126700	219	104	47.5%	9	8.7	7	7.4	1,017	30.8	69.2	31.4	68.6
Not geocoded	-	107	-	1	0.9	1	1.0	-	-	-	-	-
City Total	31,430	13,634	43.4%	502	3.7	334	2.6	176,354	16.6	83.4	46.9	53.1

* Census tracts with small populations of children under 6 appear to have high screening prevalence rates due to fewer children screened.

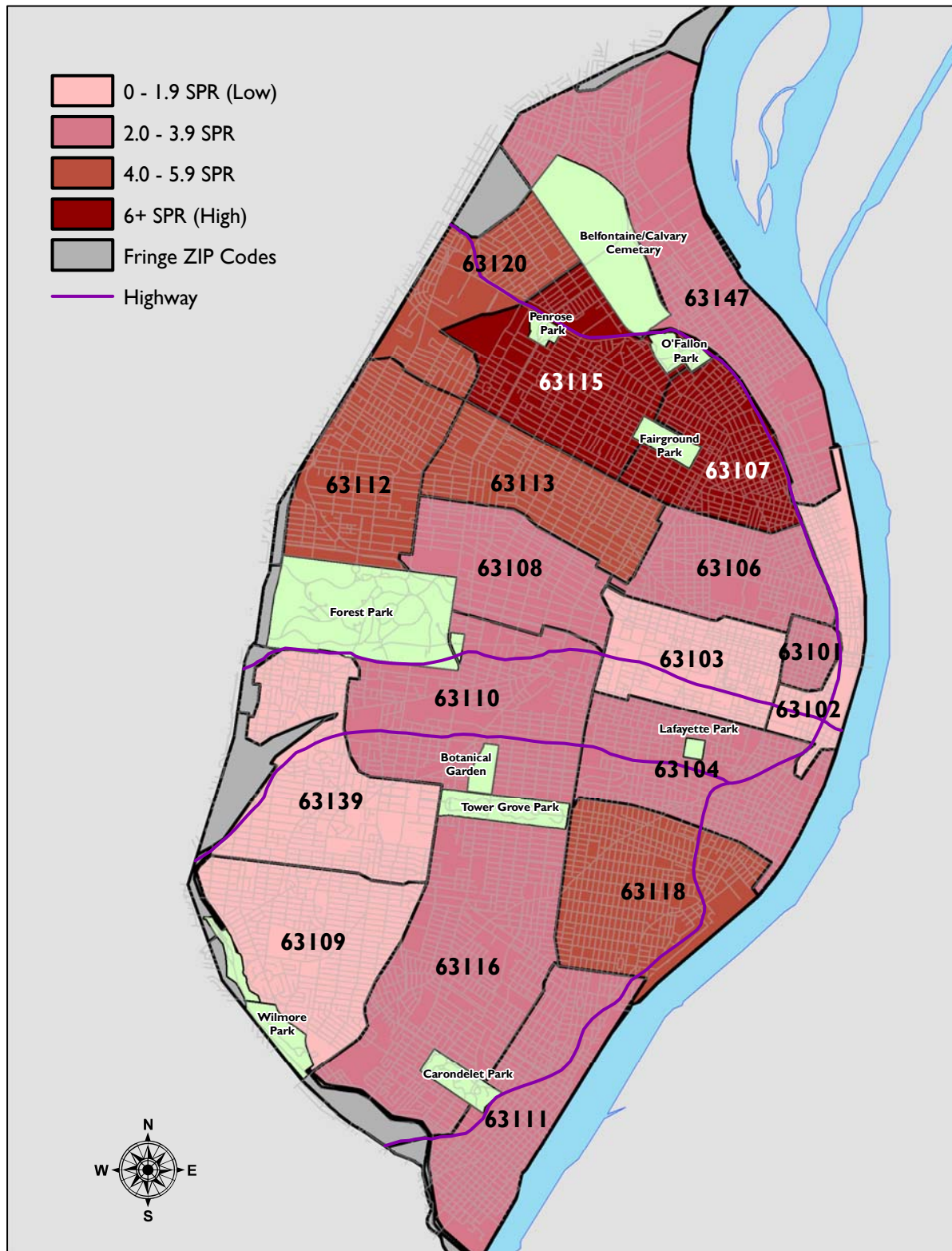
** Percent screened may exceed 100% due to use of shifting population estimates

*** Sorted by ascending Census Tract, not SPR

Maps

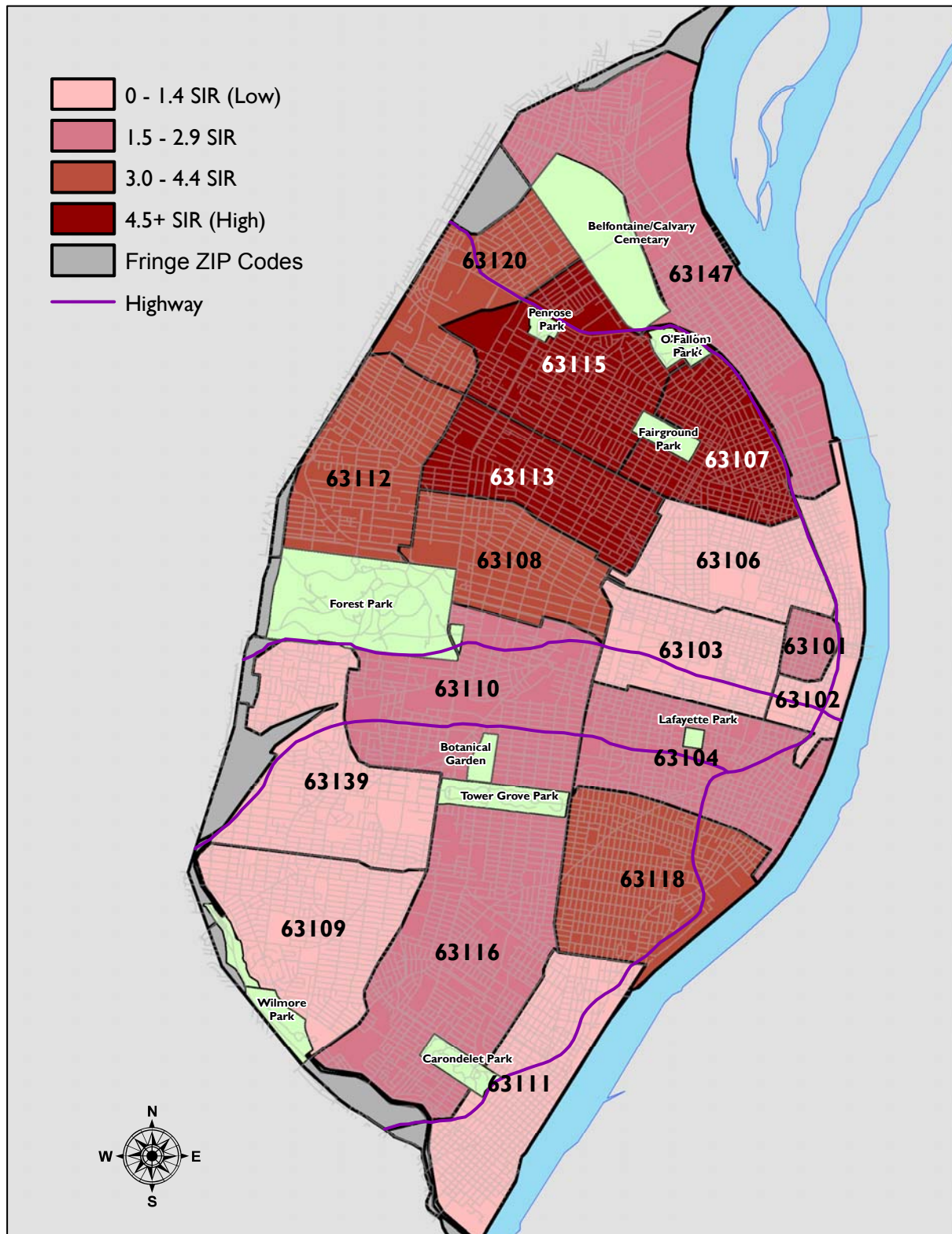
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Map I
Screening Prevalence Rates by ZIP Code, 2008



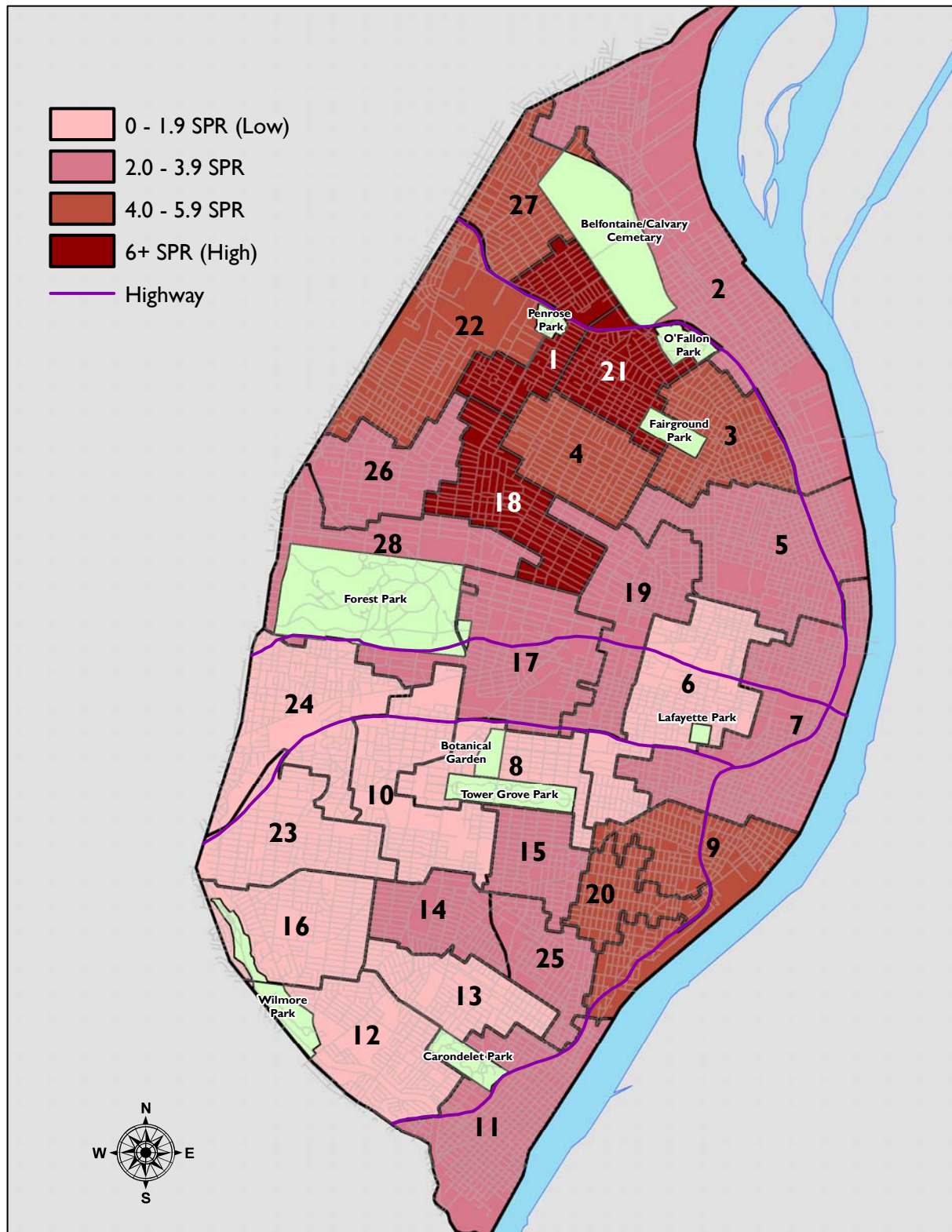
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Map 2
Screening Incidence Rates by ZIP Code, 2008



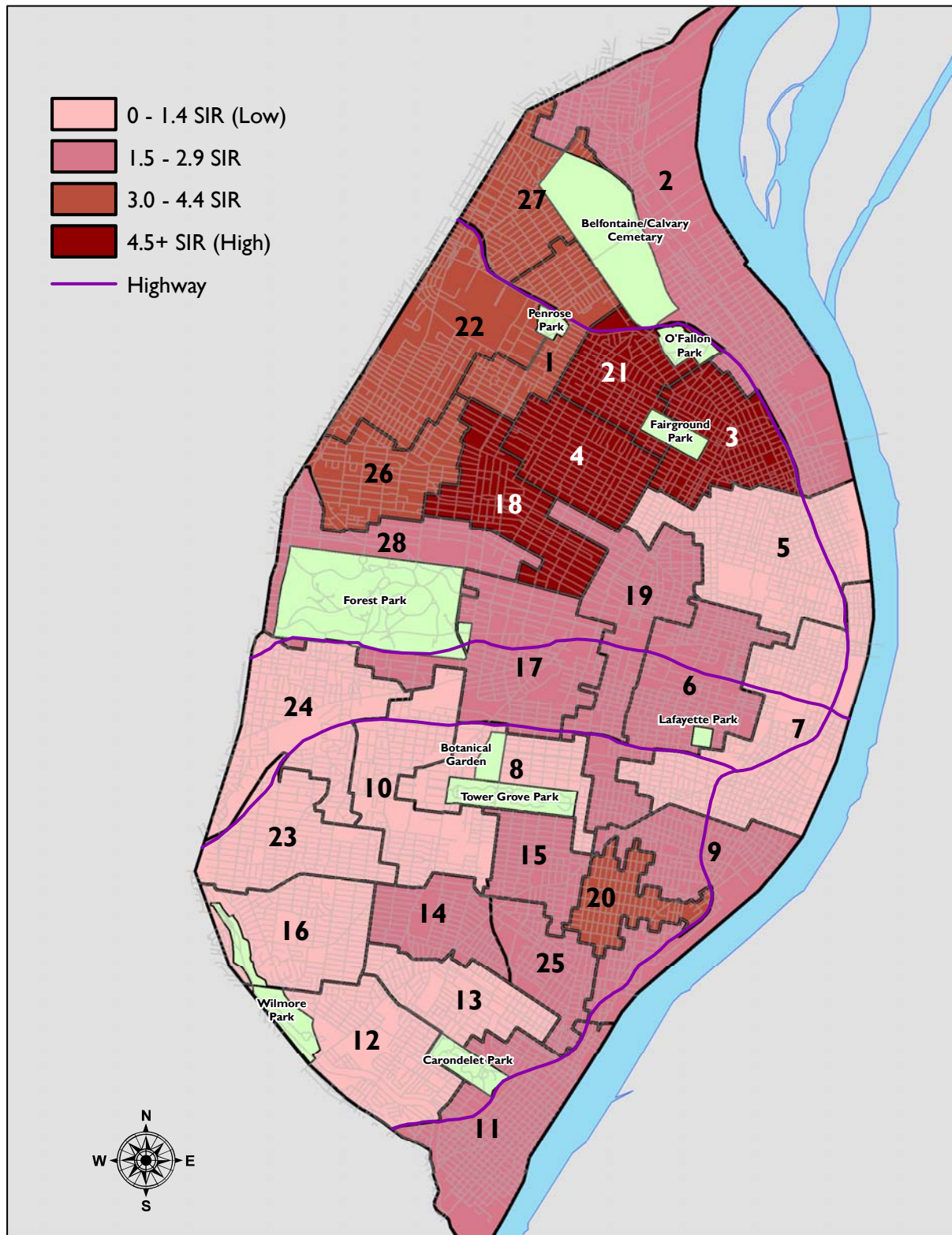
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Map 3
Screening Prevalence Rates by Ward, 2008



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Map 4
Screening Incidence Rates by Ward, 2008



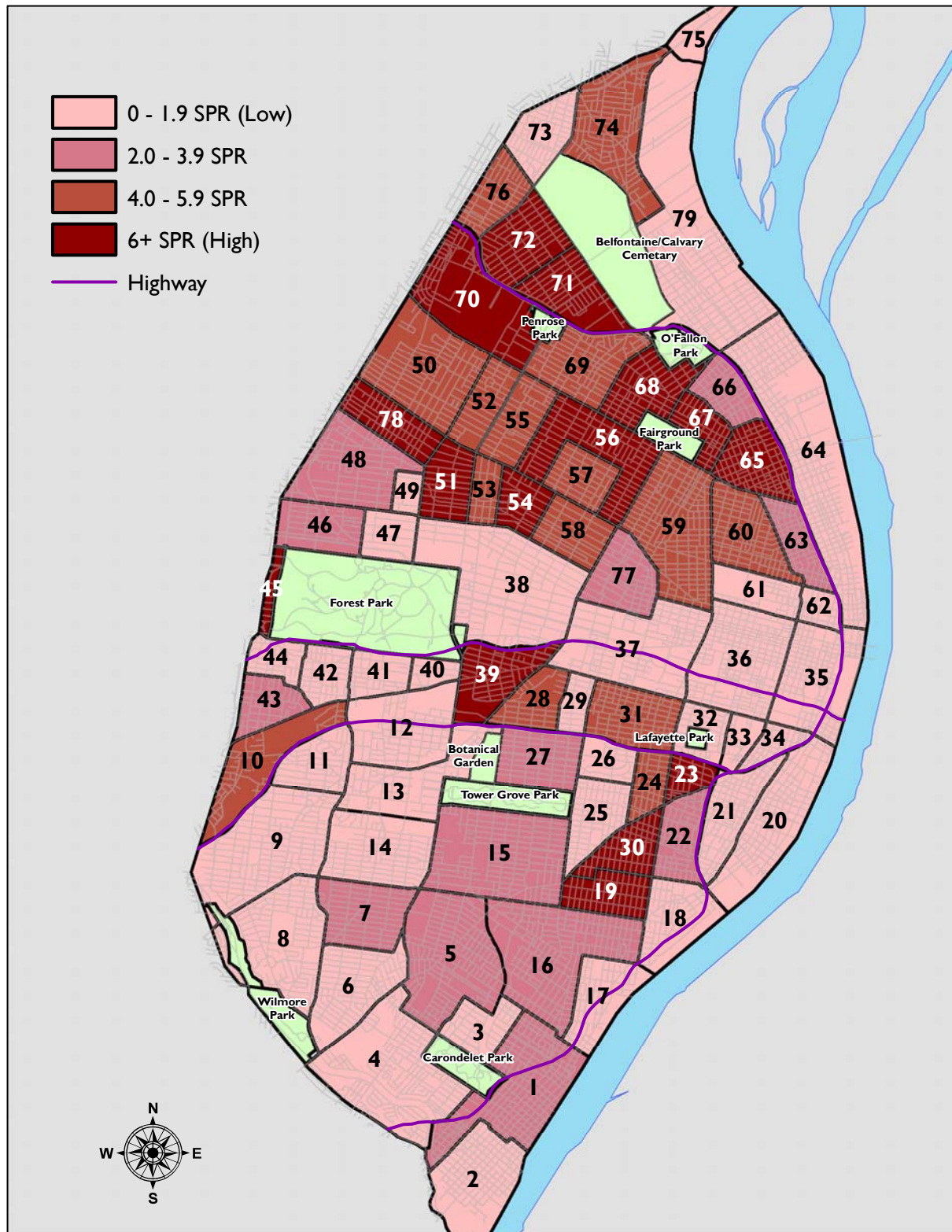
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City of St. Louis Neighborhoods Names and Numbers

Neighborhood Number	Neighborhood Name	Neighborhood Number	Neighborhood Name
1	Carondelet	41	Cheltenham
2	Patch	42	Clayton-Tamm
3	Holly Hills	43	Franz Park
4	Boulevard Heights	44	Hi-Pointe
5	Bevo Mill	45	Wydown Skinker
6	Princeton Heights	46	Skinker DeBaliviere
7	South Hampton	47	DeBaliviere Place
8	St. Louis Hills	48	West End
9	Lindenwood Park	49	Visitation Park
10	Ellendale	50	Wells Goodfellow
11	Clifton Heights	51	Academy
12	The Hill	52	Kingsway West
13	Southwest Garden	53	Fountain Park
14	North Hampton	54	Lewis Place
15	Tower Grove South	55	Kingsway East
16	Dutchtown	56	Greater Ville
17	Mount Pleasant	57	The Ville
18	Marine Villa	58	Vandeventer
19	Gravois Park	59	Jeff Vanderlou
20	Kosciusko	60	St. Louis Place
21	Soulard	61	Carr Square
22	Benton Park	62	Columbus Square
23	McKinley Heights	63	Old North St. Louis
24	Fox Park	64	Near North Riverfront
25	Tower Grove East	65	Hyde Park
26	Compton Heights	66	College Hill
27	Shaw	67	Fairground Neighborhood
28	McRee Town	68	O'Fallon
29	Tiffany	69	Penrose
30	Benton Park West	70	Mark Twain I-70 Industrial
31	The Gate District	71	Mark Twain
32	Lafayette Square	72	Walnut Park East
33	Peabody Darst Webbe	73	North Pointe
34	LaSalle Park	74	Baden
35	Downtown	75	Riverview
36	Downtown West	76	Walnut Park West
37	Midtown	77	Covenant Blu-Grand Center
38	Central West End	78	Hamilton Heights
39	Forest Park South East	79	North Riverfront
40	Kings Oak		

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Map 5
Screening Prevalence Rates by Neighborhood, 2008



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Map 6
Screening Incidence Rates by Neighborhood, 2008

